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**TEST REPORT # Q310124**  
**LSR Job #: C-904**

Compliance Testing of:  
Focus Meter with M-antenna

Test Date(s):  
May 18-21, 24- 29, June 11, 2010

Prepared For:  
Trilliant  
610 DU Luxembourg  
Granby, Quebec J2J 2V2

**In accordance with:**  
**Federal Communications Commission (FCC)**  
**Part 15, Subpart C, Section 15.247**  
**Industry Canada (IC) RSS 210 Annex 8**  
**Digital Modulation Transmitters (DTS) Operating in the**  
**Frequency Band 2400 MHz – 2483.5 MHz**

**This Test Report is issued under the Authority of:**  
Thomas T. Smith, Manager EMC Test Services

Signature: *Thomas T. Smith* Date: 06/30/10

**Test Report Reviewed by:**  
Thomas T. Smith, Manager EMC Test Services

Signature: *Thomas T. Smith* Date: 06/30/10

**Tested by:**  
Peter Feilen, EMC Engineer

Signature: *Peter Feilen* Date: 06/30/10

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## EXHIBIT 1. INTRODUCTION

### 1.1 SCOPE

<b>References:</b>	FCC Part 15, Subpart C, Section 15.247 and 15.209 FCC Part 2, Section 2.1043 paragraph (b)1. RSS GEN and RSS 210 Annex 8
<b>Title:</b>	FCC : Telecommunication – Code of Federal Regulations, CFR 47, Part 15. IC : Low-power License-exempt Radio-communication Devices (All Frequency Bands): Category I Equipment
<b>Purpose of Test:</b>	To gain FCC and IC Certification Authorization for Low-Power License-Exempt Transmitters.
<b>Test Procedures:</b>	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
<b>Environmental Classification:</b>	<ul style="list-style-type: none"> <li>• Commercial, Industrial or Business</li> <li>• Residential</li> </ul>

### 1.2 NORMATIVE REFERENCES

Publication	Year	Title
47 CFR, Parts 0-15 (FCC)	2008-10	Code of Federal Regulations - Telecommunications
RSS 210 Annex 8	2007 June	Low-power License-exempt Radio-communication Devices (All Frequency Bands): Category I Equipment
ANSI C63.4	2009	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
CISPR 16-1-1	2006-03 A1: 2006-09 A2: 2007-07	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus.
CISPR 16-2-1	2003 A1: 2004-04 A2: 2007-07	Specification for radio disturbance and immunity measuring apparatus and methods. Part 201: Conducted disturbance measurement.
FCC Public Notice DA 00-1407	2000	Part 15 Unlicensed Modular Transmitter Approval
FCC ET Docket No. 99-231	2002	Amendment to FCC Part 15 of the Commission's Rules Regarding Spread Spectrum Devices.
FCC Procedures	2007	Measurement of Digital Transmission Systems operating under Section 15.247.

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### 1.3 LS Research, LLC TEST FACILITY

LS Research, LLC is accredited by A2LA (American Association for Laboratory Accreditation) to conform to ISO/IEC 17025, 2005 "General Requirements for the Competence of Calibration and Testing Laboratories".

LS Research, LLC's scope of accreditation includes all test methods listed herein, unless otherwise noted. A copy of the accreditation may be accessed on our web site: [www.lsr.com](http://www.lsr.com). Accreditation status can be verified at A2LA's web site: [www.a2la2.net](http://www.a2la2.net).

### 1.4 LOCATION OF TESTING

All testing was performed at LS Research, LLC, W66 N220 Commerce Court, Cedarburg, Wisconsin, 53012 USA, utilizing the facilities listed below, unless otherwise noted.

List of Facilities Located at LS Research, LLC:

- Compact Chamber
- Semi-Anechoic Chamber
- Open Area Test Site (OATS)

### 1.5 TEST EQUIPMENT UTILIZED

A complete list of equipment utilized in testing is provided in Appendix A of this test report. Calibration dates are indicated in Appendix A. All test equipment is calibrated in accordance with A2LA standards.

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## EXHIBIT 2. PERFORMANCE ASSESSMENT

### 2.1 CLIENT INFORMATION

<b>Manufacturer Name:</b>	<b>Trilliant</b>
<b>Address:</b>	<b>610 DU Luxembourg, Granby, Quebec J2J 2V2</b>
<b>Contact Name:</b>	<b>Eric Bourget</b>

### 2.2 EQUIPMENT UNDER TEST (EUT) INFORMATION

*The following information has been supplied by the applicant.*

<b>Product Name:</b>	SecureMesh 1 Watt High Efficiency 2.4 GHz Radio Module
<b>Model Number:</b>	RES-3000 FOCUS
<b>Serial Number:</b>	NBZB0000110

### 2.3 ASSOCIATED ANTENNA DESCRIPTION

The PCB antenna associated with the EUT is a "M" antenna. It has an expected gain of +4.6 dBi.

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## 2.4 EUT'S TECHNICAL SPECIFICATIONS

### Additional Information:

EUT Frequency Range (in MHz)	2405-2480 MHz
RF Power in Watts	0.701 W
Conducted Output Power (in dBm)	28.46 dBm
Field Strength at 3 meters	130.53 dBuV/m (2405MHz) @ 3m
Occupied Bandwidth (99% BW)	20 dB BW: 2.29 MHz 6 dB BW: 1.68 MHz
Type of Modulation	O-QPSK
Emission Designator	2M29F1D
EIRP (in mW)	2070.14 mW
Transmitter Spurious (worst case) at 3 meters	40.7 dBuV/m (3965.60 MHz) @ 3m
Receiver Spurious (worst case) at 3 meters	39.8 dBuV/m (2437.00 MHz) @ 3m
Frequency Tolerance %, Hz, ppm	Better than 100 ppm
Microprocessor Model # (if applicable)	Atmel ATxMega 256A3
Antenna Information	
Detachable/non-detachable	Non-detachable
Type	PCB
Gain (in dBi)	+4.6 dBi Maximum gain
EUT will be operated under FCC Rule Part(s)	15.247
EUT will be operated under RSS Rule Part(s)	RSS 210 Annex 8
Modular Filing	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Portable or Mobile?	Mobile

### RF Technical Information:

Type of Evaluation (check one)	<input type="checkbox"/>	SAR Evaluation: Device Used in the Vicinity of the Human Head
	<input type="checkbox"/>	SAR Evaluation: Body-worn Device
	<input checked="" type="checkbox"/>	RF Evaluation

If RF Evaluation checked above, test engineer to complete the following:

- Evaluated against exposure limits:  General Public Use     Controlled Use
- Duty Cycle used in evaluation: 100 %
- Standard used for evaluation: OET 65
- Measurement Distance: 20 cm
- RF Value: 4.02  V/m     A/m     W/m<sup>2</sup>  
                    Measured     Computed     Calculated

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## 2.5 MPE CALCULATION

### Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	28.46 (dBm)
Maximum peak output power at antenna input terminal:	701.455 (mW)
Antenna gain(typical):	4.7 (dBi)
Maximum antenna gain:	2.951 (numeric)
Prediction distance:	20 (cm)
Prediction frequency:	2405 (MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1 (mW/cm <sup>2</sup> )
Power density at prediction frequency:	0.411842 (mW/cm <sup>2</sup> )
Maximum allowable antenna gain:	8.6 (dBi)
Margin of Compliance at 20 cm =	3.9 dB

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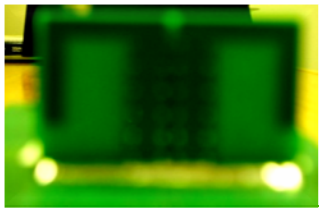
## 2.6 PRODUCT DESCRIPTION

The RES-3000-I210 SecureMesh™ is a wireless communication card designed to be installed in GE's I-210+c and I-210+c/RD meters. The meters equipped with Trilliant's SecureMesh can communicate over Mesh networks (IEEE 802.15.4).

In order to meet the test limits, channel power had to be reduced to unique power settings for some channels.

Channel Number	Power Setting
11	12
12	15
18	15
23	15
24	8
25	1

### PHOTO



Pictured above illustrates the PCB m-antenna.

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## EXHIBIT 3. EUT OPERATING CONDITIONS & CONFIGURATIONS DURING TESTS

### 3.1 CLIMATE TEST CONDITIONS

Temperature:	20-30 °C
Humidity:	20-40 %
Pressure:	645-795 mmHg

### 3.2 APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC and IC Paragraph	Test Requirements	Compliance (yes/no)
FCC : 15.207 IC : RSS GEN sect. 7.2.2	Power Line Conducted Emissions Measurements	Yes
FCC : 15.247(a)(2) IC : RSS 210 A8.2(a)	6 dB Bandwidth of a Digital Modulation System	Yes
IC : RSS GEN section 4.6.1	20 dB Bandwidth	Yes
FCC : 15.247(b) & 1.1310 IC : RSS 210 A8.4	Maximum Output Power	Yes
FCC : 15.247(i), 1.1307, 1.1310, 2.1091 & 2.1093 IC : RSS 102	RF Exposure Limit	Yes
FCC : 15.247(c) IC : RSS 210 A8.5	RF Conducted Spurious Emissions at the Transmitter Antenna Terminal	Yes
FCC : 15.247(d) IC : RSS 210 A8.2(b)	Transmitted Power Spectral Density of a Digital Modulation System	Yes
FCC : 15.247(c), 15.209 & 15.205 IC : RSS 210 A8.2(b), section 2.2, 2.6 and 2.7	Transmitter Radiated Emissions	Yes

*The digital circuit portion of the EUT has been tested and verified to comply with FCC Part 15, Subpart B, Class B Digital Devices (RSS GEN and RSS 210 of IC) and the associated Radio Receiver has also been tested and found to comply with Part 15, Subpart B – Radio Receivers (RSS GEN and RSS 210 of IC). The Receiver Test Report is available upon request.*

### 3.3 MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None  Yes (explain below)

Channel 11 was reduced to power level 12 of 15, channel 24 reduced to power level 8 and channel 25 reduced to power level 1. The power level corresponds to the conducted output power.

### 3.4 DEVIATIONS & EXCLUSIONS FROM TEST SPECIFICATIONS

None  Yes (explain below)

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## EXHIBIT 4. DECLARATION OF CONFORMITY

The EUT was found to MEET the requirements as described within the specification of FCC Title 47, CFR Part 15.247, and Industry Canada RSS-210, Issue 7 (2007), Section Annex 8 (section 8.2) for a Digital Spread Spectrum (DTS) Transmitter.

If some emissions are seen to be within 3 dB of their respective limits:

As these levels are within the tolerances of the test equipment and site employed, there is a possibility that this unit, or a similar unit selected out of production may not meet the required limit specification if tested by another agency.

LS Research, LLC certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specifications. The results in this Test Report apply only to the item(s) tested on the above-specified dates. Any modifications made to the EUT subsequent to the indicated test date(s) will invalidate the data herein, and void this certification.

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## EXHIBIT 5. RADIATED EMISSIONS TEST

### 5.1 Test Setup

The test setup was assembled in accordance with Title 47, CFR FCC Part 15 and ANSI C63.4. The EUT was placed on an 80cm high non-conductive pedestal, centered on a flush mounted 2-meter diameter turntable inside a 3 meter Semi-Anechoic, FCC listed Chamber. The EUT was operated using power as provided by a DC bench power supply of 3.3V. The unit has the capability to operate on three channels, controllable via laptop PC.

The applicable limits apply at a 3 meter distance. Measurements above 4 GHz were performed at a 1.0 meter separation distance. The calculations to determine these limits are detailed in the following pages. Please refer to Appendix A for a complete list of test equipment. The test sample was operated on three (3) standard channels: low (2405 MHz), middle (2440 MHz) and high (2475 MHz) to comply with FCC Part 15.31(m). The channels were changed using Hyperterminal software for programming through RS232 to USB communication.

### 5.2 Test Procedure

Radiated RF measurements were performed on the EUT in a 3 meter Semi-Anechoic, FCC listed Chamber, and a compact semi-anechoic chamber. The frequency range from 30 MHz to 25000 MHz was scanned and investigated. The radiated RF emission levels were manually noted at the various fixed degree settings of azimuth on the turntable and antenna height. The EUT was placed on a non-conductive pedestal in the 3 meter Semi-Anechoic Chamber, with the antenna mast placed such that the antenna was 3 meters from the EUT when measuring from 30 MHz to 4 GHz. The EUT was placed on a non-conductive pedestal in a compact semi-anechoic chamber, with the antenna mast placed such that the antenna was 1 meter from the EUT. A Biconical Antenna was used to measure emissions from 30 MHz to 300 MHz, and a Log Periodic Antenna was used to measure emissions from 300 MHz to 1000 MHz. A Double-Ridged Waveguide Horn Antenna was used from 1 GHz to 18 GHz, and a Standard Gain Horn Antenna was used for measurements from 18GHz to 25 GHz. The maximum radiated RF emissions were found by rotation 360 degrees and raising and lowering the antenna between 1 to 4 meters in height when measuring from 30 MHz to 4GHz, and 1 to 1.8 meters when measuring from 4 GHz to 25 GHz , using both horizontal and vertical antenna polarities.

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### 5.3 Test Equipment Utilized

A list of the test equipment and antennas utilized for the Radiated Emissions test can be found in Appendix A. This list includes calibration information and equipment descriptions. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. All calibrations of the antennas used were performed by an ISO 17025 accredited calibration laboratory, traceable to the SI standard. In addition, the Connecting Cables were measured for losses using a calibrated Signal Generator and an Agilent E4445A EMI Receiver. The resulting correction factors and the cable loss factors from these calibrations were entered into the Agilent E4445A EMI Receiver database. As a result, the data taken from the Agilent E4445A EMI Receiver accounts for the antenna correction factor as well as cable loss or other corrections, and can therefore be entered into the database as a corrected meter reading. The Agilent E4445A EMI Receiver was operated with a resolution bandwidth of 120 kHz for measurements below 1 GHz (video bandwidth of 300 kHz). Above 1 GHz, a bandwidth of 1 MHz was utilized (video bandwidth of 8 MHz). From 4 to 25GHz, the Agilent 4446A Spectrum Analyzer was used.

### Test Results

The EUT was found to **MEET** the Radiated Emissions requirements of Title 47 CFR, FCC Part 15.247 for a DTS transmitter [Canada RSS-210, Issue 7 (2007), Annex 8 (section 8.2)]. The frequencies with significant RF signal strength were recorded and plotted as shown in the Data Charts and Graphs.

### 5.4 Test Equipment List

Test Equipment	Manufacturer	Model No.	Serial No.
EMI Receiver	Agilent	E4445A	3617A00320
EMI Receiver Pre-Select.	Agilent	N9039A	3448A00296
Spectrum Analyzer	Agilent	E4446A	US45300564
Log Periodic Antenna	EMCO	93146	9701-4855
Horn Antenna	EMCO	3115	6907
Bicon Antenna	EMCO	93110B	9702-2918
Pre-Amp	Adv. Microwave	WLA612	1145A04094
Horn Antenna – Std. Gain	EMCO	3160-09	9809-1120

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## 5.5 CALCULATION OF RADIATED EMISSIONS LIMITS

The maximum peak output power of an intentional radiator in the 2400-2483.5 MHz band, as specified in Title 47 CFR 15.247 (b)(3), is 1 Watt. The harmonic and spurious RF emissions, as measured in any 100 kHz bandwidth, as specified in 15.247 (d), shall be at least 20 dB below the measured power of the desired signal, and must also meet the requirements described in 15.205(c).

The following table depicts the general radiated emission limits above 30 MHz. These limits are obtained from Title 47 CFR, Part 15.209, for radiated emissions measurements. These limits were applied to any signals found in the 15.205 restricted bands.

Frequency (MHz)	3 m Limit $\mu\text{V/m}$	3 m Limit (dB $\mu\text{V/m}$ )	1 m Limit (dB $\mu\text{V/m}$ )
30-88	100	40.0	-
88-216	150	43.5	-
216-960	200	46.0	-
960-24,000	500	54.0	63.5

Sample conversion from field strength  $\mu\text{V/m}$  to dB $\mu\text{V/m}$ :

$$\begin{aligned} \text{dB}\mu\text{V/m} &= 20 \log_{10} (100) \\ &= 40 \text{ dB}\mu\text{V/m} \text{ (from 30-88 MHz)} \end{aligned}$$

For measurements made at 1.0 meter, a 9.5 dB correction has been invoked.

$$\begin{aligned} 1\text{m limit (dB}\mu\text{V/m)} &= 3\text{m limit (dB}\mu\text{V/m)} - 20 \log_{10} (1\text{m}/3\text{m}) \\ > 960 \text{ MHz for example: } 500\mu\text{V/m or } 54.0 \text{ dB}\mu\text{V/m at 3 meters} - 20\log_{10} (1/3) &= - 9.5\text{dB} \\ 54.0 + 9.5 &= 63.5 \text{ dB}\mu\text{V/m at 1 meter} \end{aligned}$$

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5.6

**RADIATED EMISSIONS TEST DATA CHART**

3 Meter Measurements of Electromagnetic Radiated Emissions

Test Standard: 47CFR, Part 15.205 and 15.247(DTS)

RSS 210 A8, sections 2.2,2.6 and 2.7

Frequency Range Inspected: 30 MHz to 25000 MHz

Manufacturer:	Trilliant					
Date(s) of Test:	May 19, 20, 21, 27, 28, 2010					
Test Engineer(s):	Peter Feilen					
Voltage:	3.3 VDC					
Operation Mode:	Pseudo-Random Bit Sequence Modulated					
Environmental Conditions in the Lab:	Temperature: 20 – 25° C Relative Humidity: 30 – 60 %					
EUT Power:		Single Phase	VAC		3 Phase	VAC
		Battery		X	Other:	3.3 VDC
EUT Placement:	X	80cm non-conductive test fixture			10cm Spacers	
EUT Test Location:	X	3 Meter Semi-Anechoic FCC Listed Chamber			3/10m OATS	
Measurements:		Pre-Compliance		Preliminary	X	Final
Detectors Used:	X	Peak	X	Quasi-Peak		Average

The following table depicts the level of significant spurious radiated RF emissions found:

Frequency (MHz)	Ant. Polarity	EUT Position	Height (meters)	Azimuth (0° - 360°)	Measured EFI (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1215.0	h	tt	1.00	0	33.3	54.0	20.7
1230.0	v	tt	1.00	0	34.9	54.0	19.1
1700.0	v	tt	1.38	0	38.8	54.0	15.2
3965.6	v	tt	1.00	0	40.7	54.0	13.3
3970.0	v	tt	1.00	0	40.3	54.0	13.7
3735.8	h	tt	1.00	0	40.2	54.0	13.8
981.9	h	tt	1.00	0	30.0	54.0	24.1
995.1	v	tt	1.00	0	29.2	54.0	24.8
989.2	v	tt	1.00	0	22.6	54.0	31.4
299.6	v	tt	1.00	0	25.3	46.0	20.7
298.0	h	tt	1.00	0	24.8	46.0	21.2

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## RADIATED EMISSIONS DATA CHART (continued)

The following table depicts the level of significant radiated RF fundamental and harmonic emissions seen on Channel 11:

Frequency (MHz)	Polarization	Peak (dBuV/m)	Corrected Peak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (meters)	Azimuth (0°-360°)
4811.00	Horizontal	59.3	39.3	49.9	63.5	24.2	1.21	335
7216.42	Horizontal	59.9	39.9	50.1	63.5	23.6	1.06	6
9617.98	Horizontal	52.3	32.3	42.6	110.4	78.1	1.21	346
12022.73	Horizontal	56.8	36.8	45.7	63.5	26.7	1.02	300
14433.42	Horizontal	60.1	40.1	50.2	110.4	70.3	1.40	323
16831.00	Horizontal	53.4	33.4	41.8	110.4	77.0	1.05	41
19240.00	Horizontal	Note 1			63.5			
21645.00	Horizontal	Note 1			110.4			
24050.00	Horizontal	Note 1			110.4			
4810.48	Vertical	63.0	43.0	55.2	63.5	20.5	1.26	13
7214.52	Vertical	51.5	31.5	40.8	63.5	32.0	1.16	337
9619.78	Vertical	47.8	27.8	35.7	110.4	82.6	1.02	3
12024.72	Vertical	52.3	32.3	39.1	63.5	31.2	1.02	17
14429.67	Vertical	52.3	32.3	39.9	110.4	78.1	1.72	36
16834.74	Vertical	52.8	32.8	40.7	110.4	77.6	1.03	2
19240.00	Vertical	Note 1			63.5			
21645.00	Vertical	Note 1			110.4			
24050.00	Vertical	Note 1			110.4			

The following table depicts the level of significant radiated RF fundamental and harmonic emissions seen on Channel 18:

Frequency (MHz)	Polarization	Peak (dBuV/m)	Corrected Peak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (0°-360°)
4881.07	Horizontal	59.5	39.5	50.2	63.5	24.0	1.17	1.9
7321.57	Horizontal	58.5	38.5	48.8	63.5	25.0	1.02	356.1
9757.95	Horizontal	51.2	31.2	40.5	110.4	79.2	1.11	344.7
12202.68	Horizontal	53.9	33.9	44.4	63.5	29.6	1.17	310.8
14642.92	Horizontal	66.1	46.1	56.1	110.4	64.3	1.04	322.2
17083.00	Horizontal	58.3	38.3	46.1	110.4	72.1	1.21	35.1
19520.00	Horizontal	Note 1			63.5			
21960.00	Horizontal	Note 1			110.4			
24400.00	Horizontal	Note 1			110.4			
4880.93	Vertical	70.3	50.3	61.8	63.5	13.2	1.09	17.4
7318.57	Vertical	55.9	35.9	46.1	63.5	27.6	1.08	348
9762.27	Vertical	50.1	30.1	39.6	110.4	80.3	1.11	310.7
12197.47	Vertical	54.7	34.7	45.1	63.5	28.8	1.48	349.5
14637.05	Vertical	64.4	44.4	54.8	110.4	66.0	1.05	348.1
17083.52	Vertical	54.4	34.4	43.8	110.4	76.0	1.08	307.5
19520.00	Vertical	Note 1			63.5			
21960.00	Vertical	Note 1			110.4			
24400.00	Vertical	Note 1			110.4			

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
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## RADIATED EMISSIONS DATA CHART (continued)

The following table depicts the level of significant radiated RF fundamental and harmonic emissions seen on Channel 25:

Frequency (MHz)	Polarization	Peak (dBuV/m)	Corrected Peak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (0°-360°)
4949.02	Horizontal	60.8	40.8	51.7	63.5	22.7	1.21	34
7423.58	Horizontal	54.5	34.5	44.1	63.5	29.0	1.15	10
9901.98	Horizontal	52.8	32.8	42.5	98.3	65.5	1.17	39
12372.63	Horizontal	57.0	37.0	47.3	63.5	26.5	1.03	319
14853.02	Horizontal	60.8	40.8	51.1	98.3	57.5	1.13	350
17328.53	Horizontal	56.3	36.3	45.4	98.3	62.0	1.18	11
19800.00	Horizontal	Note 1			63.5			
22275.00	Horizontal	Note 1			63.5			
24750.00	Horizontal	Note 1			98.3			
4950.97	Vertical	73.4	53.4	65.1	63.5	10.1	1.21	20
7426.50	Vertical	57.3	37.3	47.6	63.5	26.2	1.06	2
9901.67	Vertical	52.0	32.0	41.9	98.3	66.3	1.00	324
12372.40	Vertical	55.8	35.8	45.5	63.5	27.7	1.13	13
14853.00	Vertical	62.9	42.9	53.2	98.3	55.4	1.15	342
17328.32	Vertical	55.1	35.1	44.0	98.3	63.2	1.10	3
19800.00	Vertical	Note 1			63.5			
22275.00	Vertical	Note 1			63.5			
24750.00	Vertical	Note 1			98.3			

Notes for tables on pages 16 & 17:

- 1) Measurement is at system noise floor or a minimum of 10 dB below the limit
- 2) For measurements of the fundamental power, because of spectral bandwidth, the receiver was set to RBW=VBW=3 MHz.
- 3) A Quasi-Peak Detector was used in measurements below 1 GHz, and a 10 Hz video averaged Peak Detector was used in measurements above 1 GHz. Only the results from the Peak Detector with video averaging are published in the table above. A non-video averaged peak detector was used to ensure the peak emissions did not exceed 20 dB above the limits.
- 4) Measurements above 4 GHz were made at 1 meters of separation from the EUT
- 5) Corrected peak readings are the peak reading adjusted by -20 dB due to duty cycle relaxation, which is justified in Appendix D

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 17 of 59</b>

## 5.7 Test Setup Photo(s) – Radiated Emissions Test

EUT on Test Pedestal



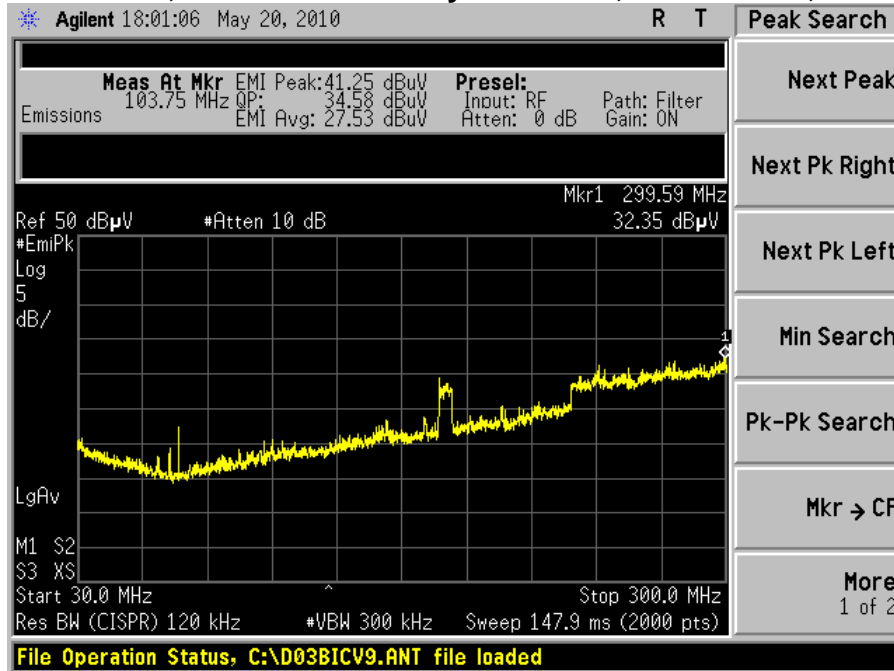
Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 18 of 59</b>

## 5.8 Screen Captures - Radiated Emissions Test

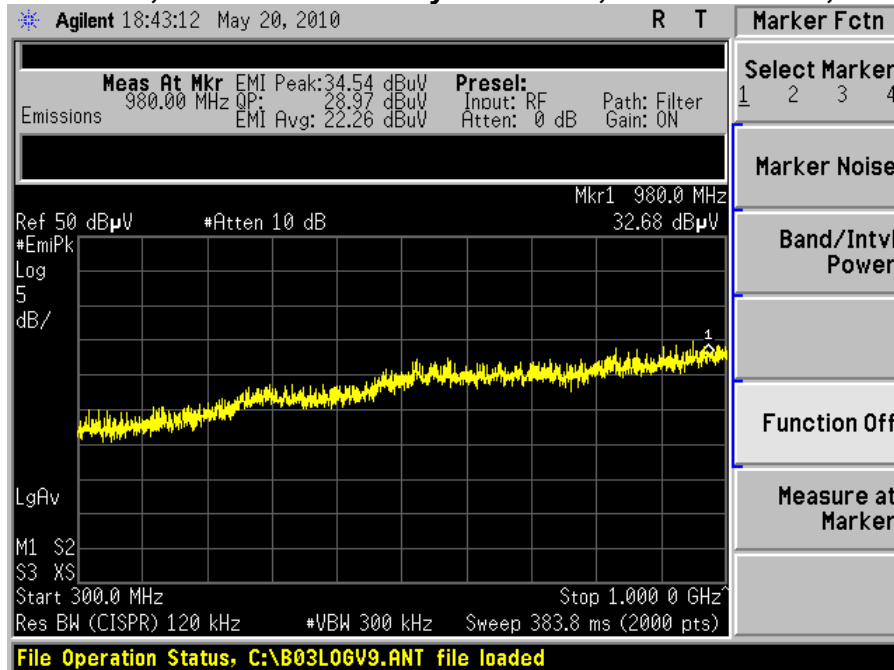
These screen captures represent Peak Emissions. For radiated emission measurements, a Quasi-Peak detector function is utilized when measuring frequencies below 1 GHz, and an Average detector function is utilized when measuring frequencies above 1 GHz.

The signature scans shown here are from worst-case emissions, as measured on channels 11, 18, or 25, with the sense antenna both in vertical and horizontal polarity for worst case presentations.

### Channel 18, Antenna Vertically Polarized, 30-300 MHz, at 3m



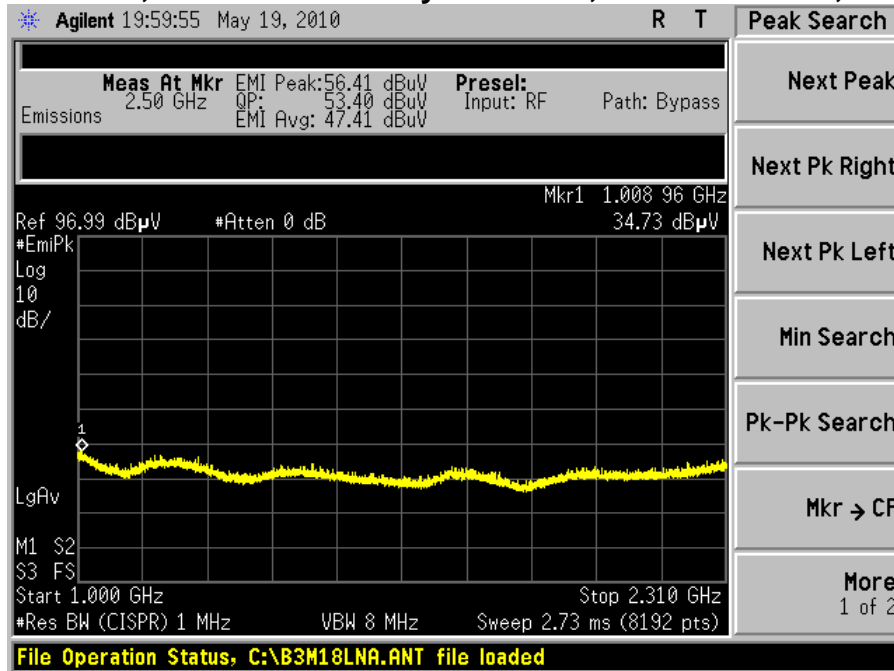
### Channel 18, Antenna Vertically Polarized, 300-1000 MHz, at 3m



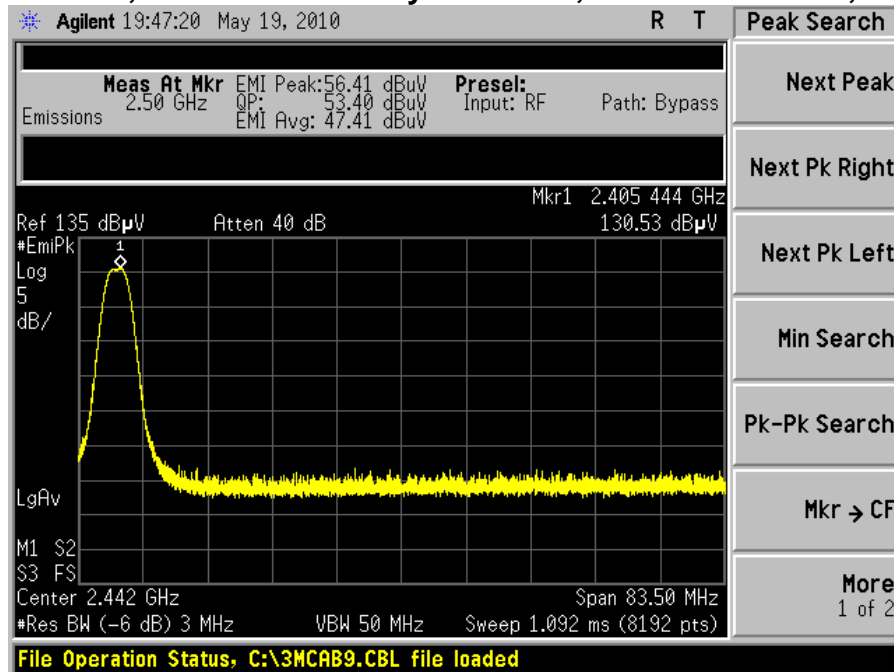
Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	Page 19 of 59

**Screen Captures - Radiated Emissions Testing (continued)**

**Channel 18, Antenna Vertically Polarized, 1000-2310 MHz, at 3m**



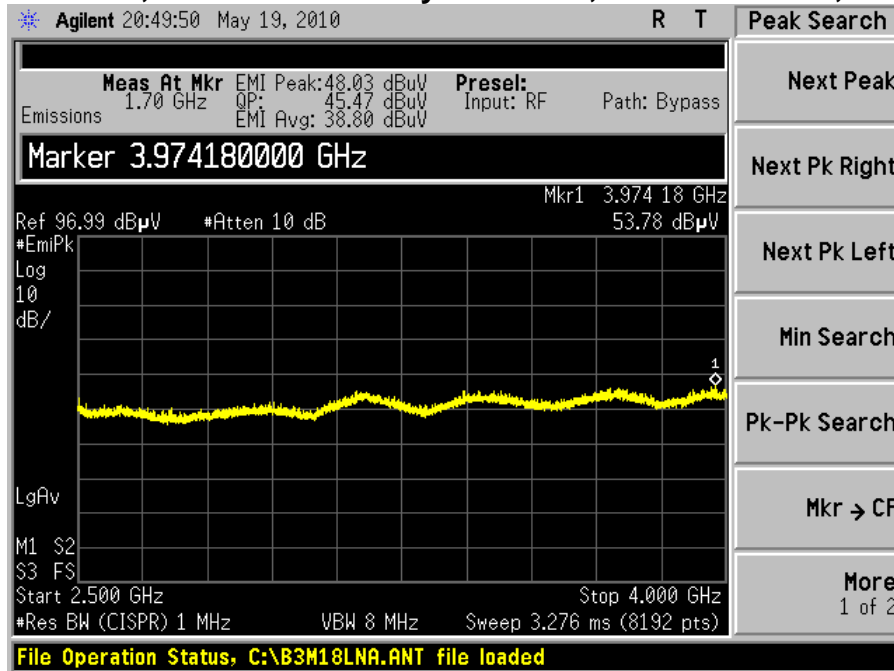
**Channel 11, Antenna Vertically Polarized, 2400-2483.5 MHz, at 3m**



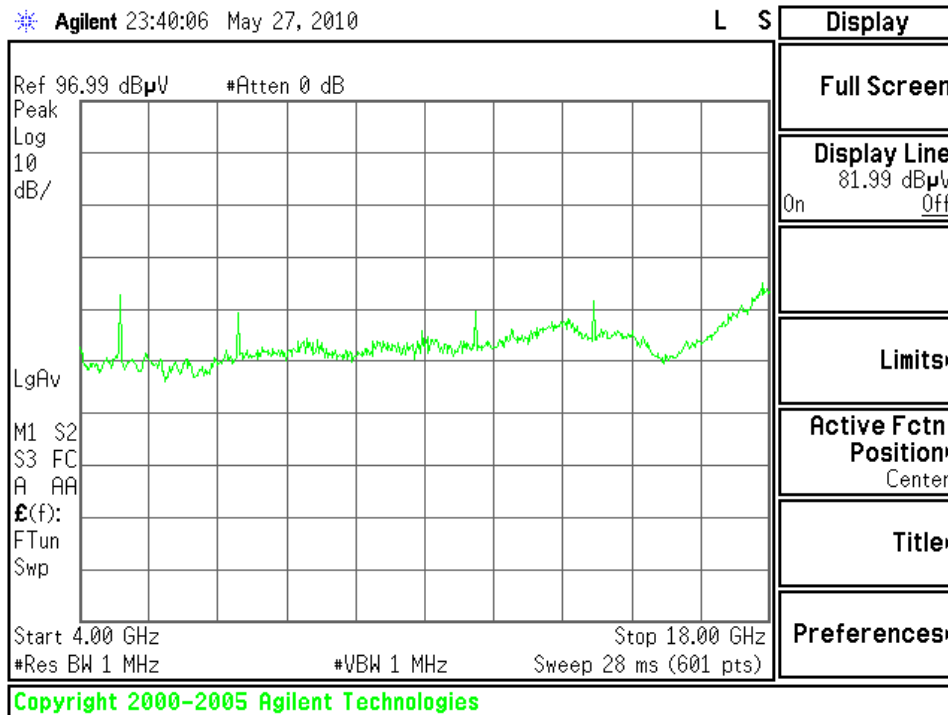
Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	Page 20 of 59

**Screen Captures - Radiated Emissions Testing (continued)**

**Channel 25, Antenna Vertically Polarized, 2500-4000 MHz, at 3m**



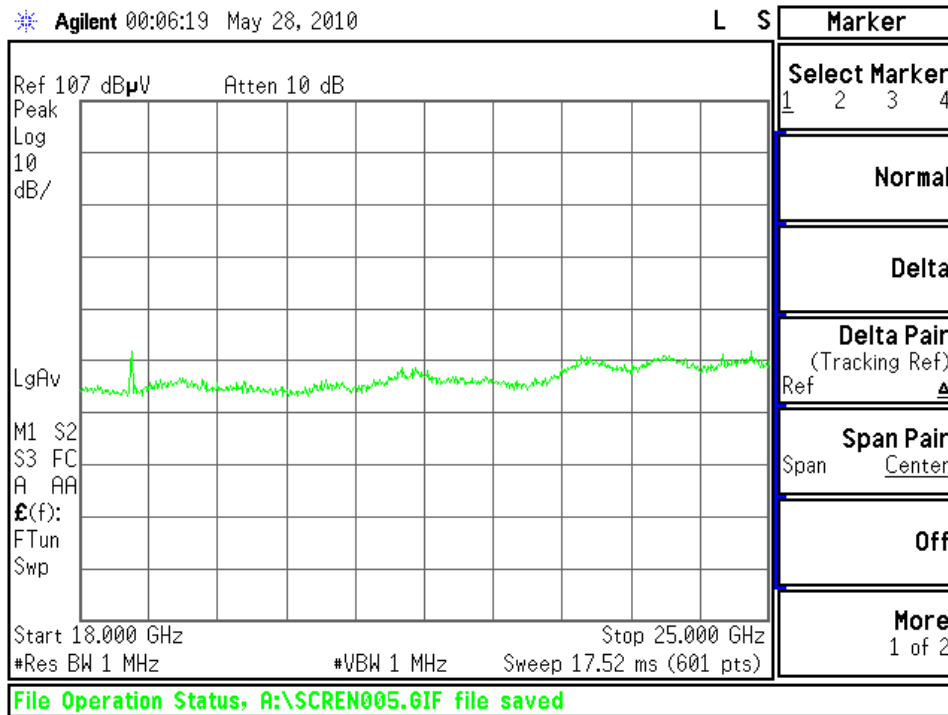
**Channel 11, Antenna Vertically Polarized, 5000-18000 MHz, at 1m**



Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 21 of 59</b>

**Screen Captures - Radiated Emissions Testing (continued)**

**Channel 11, Antenna Vertically Polarized, 18000-25000 MHz, at 1m**



Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 22 of 59</b>

## 5.9 Receive Mode Testing

Per the requirements of RSS-210, the EUT was placed in continuous receive mode and the radiated spurious emissions were measured and compared to the limits stated in RSS-Gen Section 4.10.

The test setup, procedure, and equipment utilized were identical to that described in sections 5.1, 5.2, and 5.3 of this document.

Measurement data and screen captures from the receive tests are presented below:

Frequency (MHz)	Height (m)	Azimuth (degree)	Quasi Peak Reading (dB $\mu$ V/m)	Quasi Peak Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Polarity	EUT orientation
993.85	1.00	0	29.4	54.0	24.6	V	TT
990.26	1.00	0	30.2	54.0	23.8	V	TT

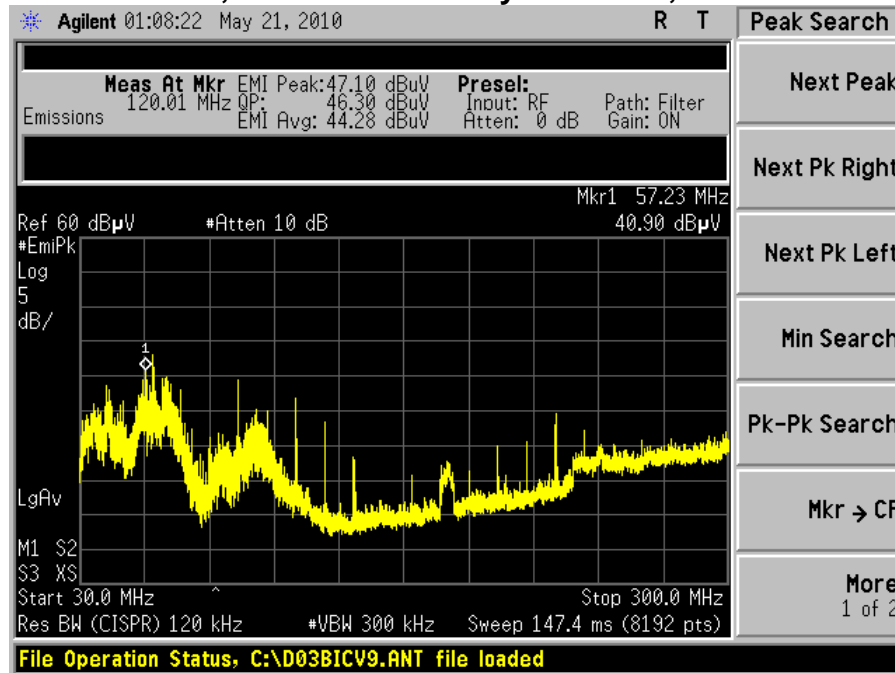
Frequency (MHz)	Height (m)	Azimuth (degree)	Average Reading (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Polarity	EUT orientation
3445.99	1.00	0	35.7	54.0	18.3	V	TT
2437.89	1.00	0	39.8	54.0	14.2	V	TT
3958.13	1.00	0	36.0	54.0	18.0	V	TT

## Screen Captures - Radiated Emissions Testing – Receive Mode

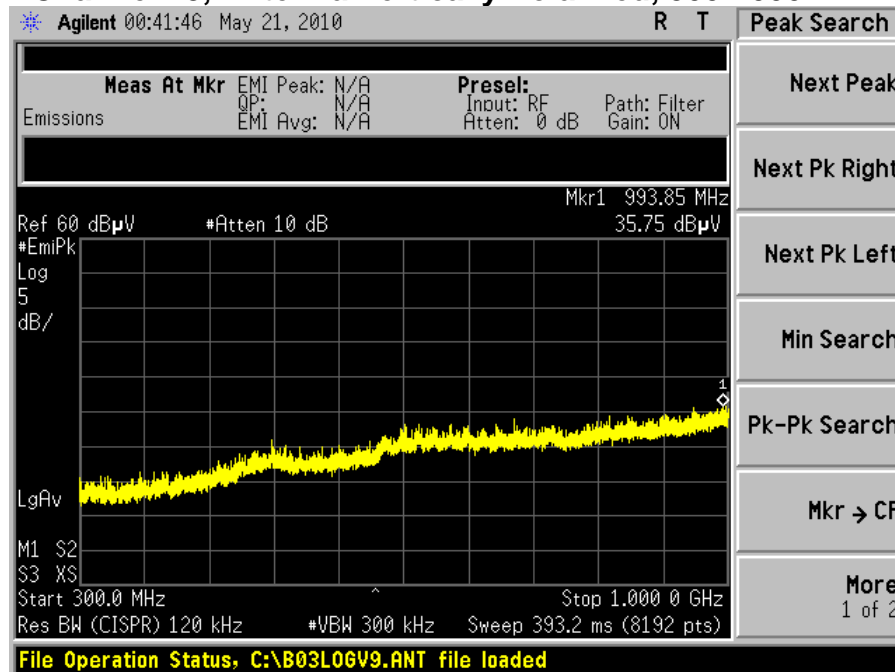
These screen captures represent Peak Emissions. For radiated emission measurements, a Quasi-Peak detector function is utilized when measuring frequencies below 1 GHz, and an Average detector function is utilized when measuring frequencies above 1 GHz.

The signature scans shown here are from worst-case emissions, as measured on channels 11, 18 and 25, with the sense antenna both in vertical and horizontal polarity for worst case presentations.

### Channel 18, Antenna Vertically Polarized, 30-300 MHz



### Channel 18, Antenna Vertically Polarized, 300-1000 MHz

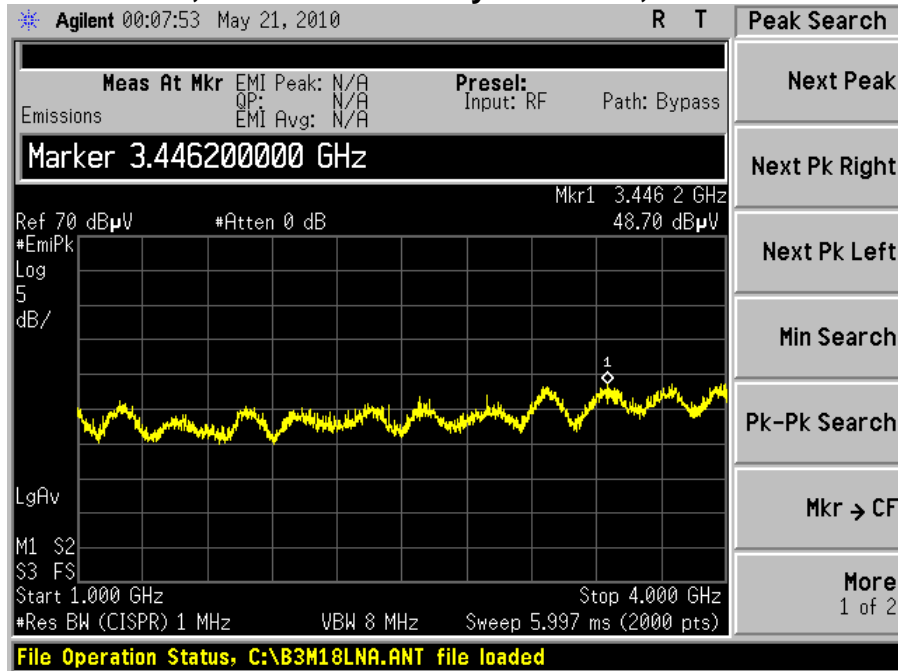


Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	Page 24 of 59

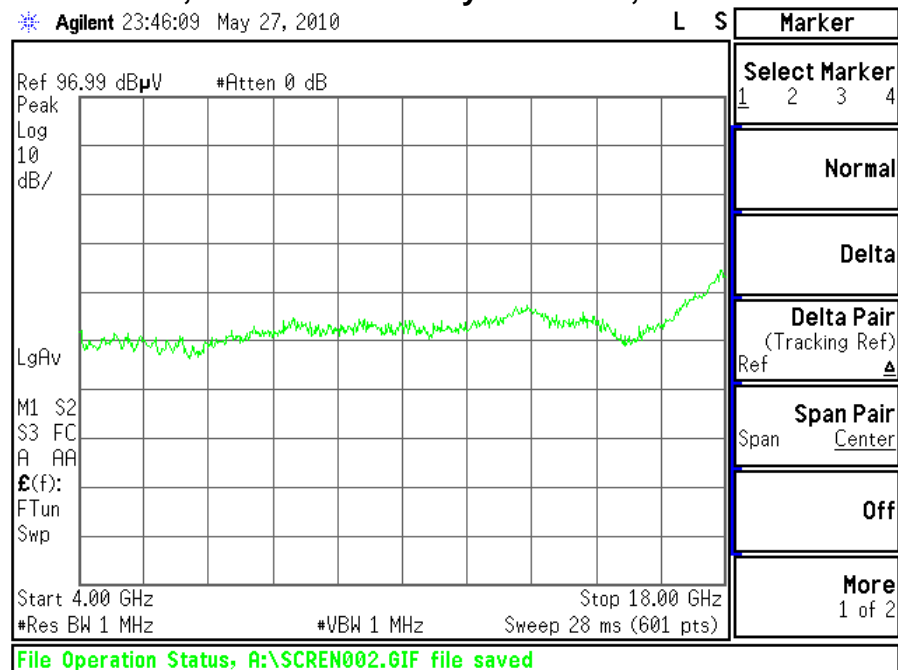


**Screen Captures - Radiated Emissions Testing – Receive Mode (continued)**

**Channel 18, Antenna Vertically Polarized, 1000-4000 MHz**



**Channel 18, Antenna Vertically Polarized, 4000-18000 MHz**



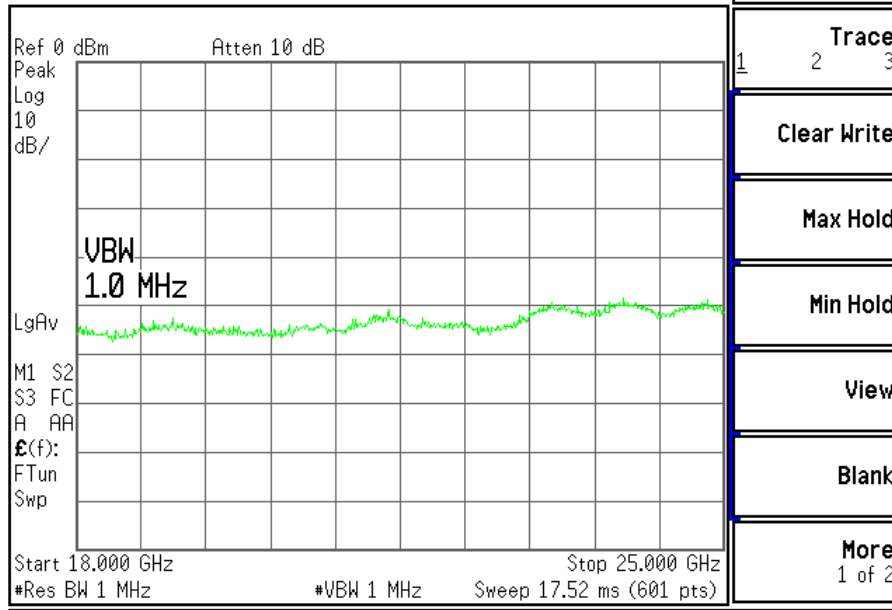
Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	Page 25 of 59

**Screen Captures - Radiated Emissions Testing – Receive Mode (continued)**

**Channel 18, Antenna Vertically Polarized, 18000-25000 MHz**

Agilent 00:00:46 May 28, 2010

L S



File Operation Status, C:\18GHZ25.ANT file loaded

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 26 of 59</b>

## EXHIBIT 6. CONDUCTED EMISSIONS TEST, AC POWER LINE:

### 6.1 Test Setup

The test area and setup are in accordance with ANSI C63.4 and with Title 47 CFR, FCC Part 15 (Industry Canada RSS-210, Issue 7, 2007). The EUT was placed in a non-conductive wooden pedestal, with a height of 80 cm above the reference ground plane. The EUT's power cable was plugged into a 50Ω (ohm), 50/250 μH Line Impedance Stabilization Network (LISN). The AC power supply of 120V was provided via an appropriate broadband EMI Filter, and then to the LISN line input. Final readings were then taken and recorded. After the EUT was setup and connected to the LISN, the RF Sampling Port of the LISN was connected to a 10 dB Attenuator-Limiter, and then to the Agilent E4445A Receiver. The EMCO LISN used has the ability to terminate the unused port with a 50Ω (ohm) load when switched to either L1 (line) or L2 (neutral).

### 6.2 Test Procedure

The EUT was investigated in continuous modulated transmit mode for this portion of the testing. The appropriate frequency range and bandwidths were selected on the EMI Receiver, and measurements were made. The bandwidth used for these measurements is 9 kHz, as specified in Title 47 CFR, FCC Part 15.35, for Quasi-Peak and Average detectors in the frequency range of 150 kHz to 30MHz. Final readings were then taken and recorded.

### 6.3 Test Equipment Utilized

A list of the test equipment and accessories utilized for the Conducted Emissions test is provided in Appendix A. This list includes calibration information and equipment descriptions. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. Calibrations of the LISN and Limiter are performed by an ISO 17025 accredited calibration laboratory, and traceable to the SI standard. All cables are calibrated and checked periodically for conformance. The emissions are measured on the Agilent E4445A EMI Receiver, which has automatic correction for all factors stored in memory and allows direct readings to be taken.

### 6.4 Test Equipment List

Test Equipment	Manufacturer	Model No.	Serial No.
EMI Receiver	Agilent	E4445A	MY48250225
Pre-selector	Agilent	N9039A	MY46520110
LISN	EMCO	3816/2NM	9701-1057
Transient Limiter	HP	119474A	3107A01708

### Test Results

The EUT was found to **MEET** the Conducted Emission requirements of FCC Part 15.207 Conducted Emissions for an Intentional Radiator. See the Data Charts and Graphs for more details of the test results.

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
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**6.5 FCC Limits of Conducted Emissions at the AC Mains Ports**

Frequency Range (MHz)	Class B Limits (dB $\mu$ V)		Measuring Bandwidth
	Quasi-Peak	Average	
0.150 -0.50 *	66-56	56-46	RBW = 9 kHz VBW $\geq$ 9 kHz for QP VBW = 1 Hz for Average
0.5 – 5.0	56	46	
5.0 – 30	60	50	
* The limit decreases linearly with the logarithm of the frequency in this range.			

## 6.6

### CONDUCTED EMISSIONS TEST DATA CHART

Frequency Range inspected: 150 KHz to 30 MHz

Test Standard: FCC 15.207 Class B

IC RSS GEN 7.2.2

Manufacturer:	Trilliant				
Date(s) of Test:	June 11, 2010				
Test Engineer:	Peter				
Voltage:	240 VAC				
Operation Mode:	Normal				
Environmental Conditions in the Lab:	Temperature: 20 – 25° C Relative Humidity: 30 – 60 %				
Test Location:					Chamber
EUT Placed On:		40cm from Vertical Ground Plane			10cm Spacers
	X	80cm above Ground Plane			Other:
Measurements:		Pre-Compliance		Preliminary	X Final
Detectors Used:	X	Peak	X	Quasi-Peak	X Average

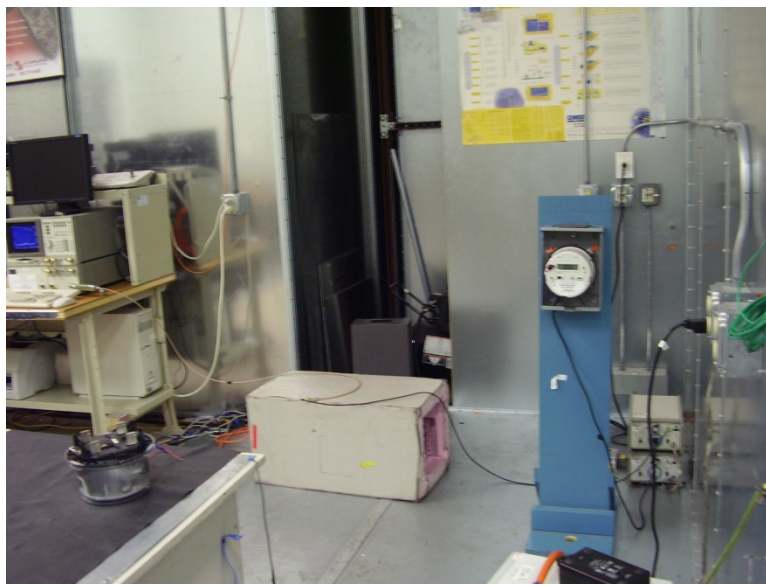
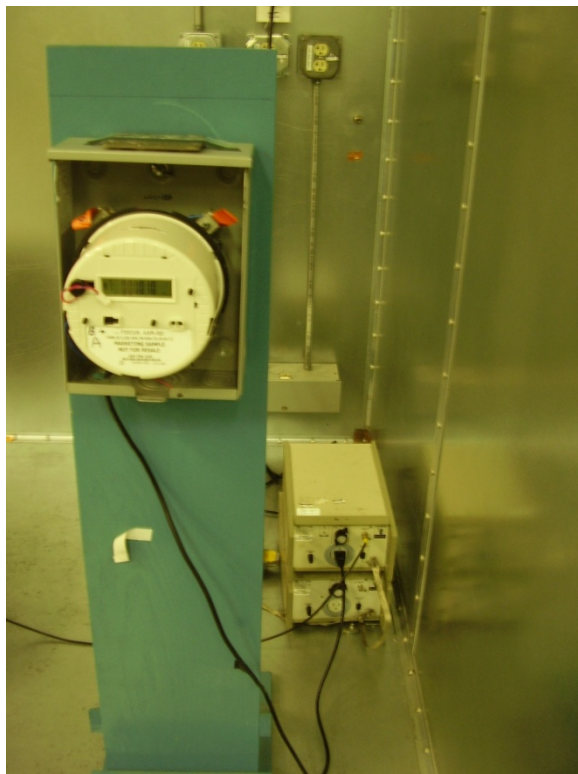
Frequency (MHz)	Line	Quasi-Peak			AVERAGE		
		Q-Peak Reading (dBµV)	Q-Peak Limit (dBµV)	Quasi-Peak Margin (dB)	Average Reading (dBµV)	Average Limit (dBµV)	Average Margin (dB)
0.526	L1	13.1	56	42.9	1.5	46	44.5
3.999	L1	36.6	56	19.4	35.3	46	10.7
2.999	L2	36.6	56	19.4	35.3	46	10.7
1.981	L2	19.0	56	37	14.5	46	31.5

#### Notes:

- 1) All other emissions were better than 20 dB below the limits.
- 3) The EUT exhibited similar emissions in transmit and receive modes, and across the Low, Middle and High channels tested.

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 29 of 59</b>

## 6.7 Test Setup Photo(s) – Conducted Emissions Test



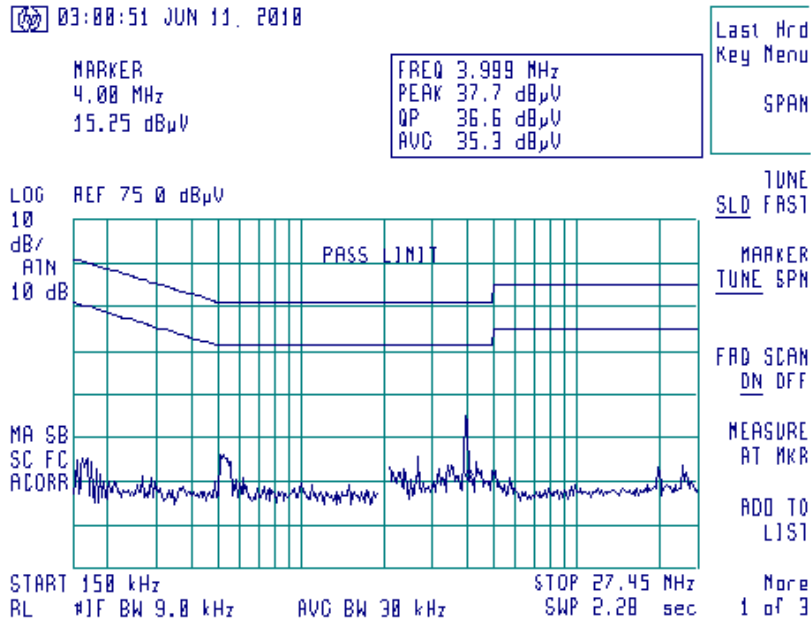
Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 30 of 59</b>

## 6.8 Screen Captures – Conducted Emissions Test

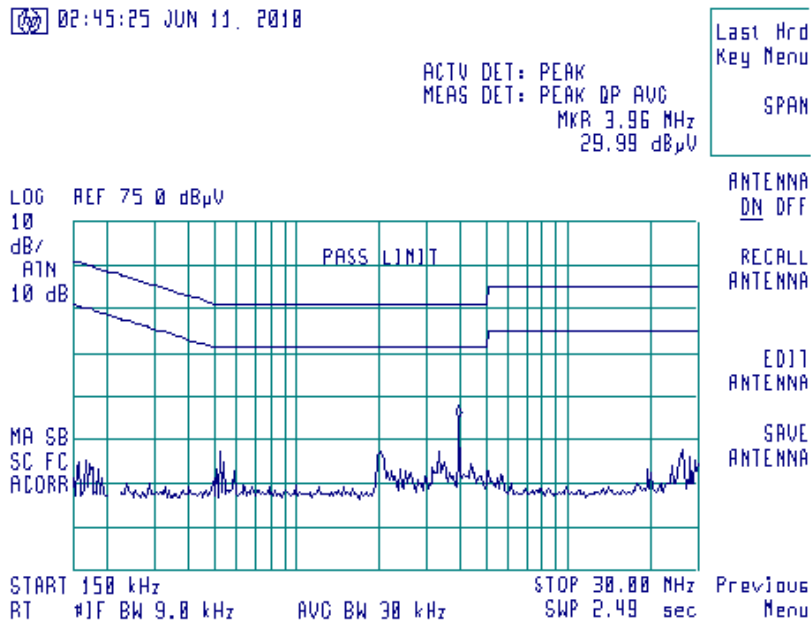
These screen captures represent Peak Emissions. For conducted emission measurements, both a Quasi-Peak detector function and an Average detector function are utilized. The emissions must meet both the Quasi-peak limit and the Average limit as described in 47 CFR 15.207 and RSS GEN 7.2.2 (Table 2).

The signature scans shown here are from channel 18, chosen as being a good representative of channels.

### Channel 18, 2440 MHz, Line 1



### Channel 18, 2440 MHz, Line 2



Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	Page 31 of 59

## EXHIBIT 7. OCCUPIED BANDWIDTH:

### 7.1 Limits

For a Digital Modulation System, the 6 dB bandwidth shall be at least 500 kHz.

### 7.2 Method of Measurements

Refer to ANSI C63.4 and FCC Procedures (2007) for Digital Transmission Systems operating under 15.247.

The transmitter output was connected to the Spectrum Analyzer. The bandwidth of the fundamental frequency was measured with the Spectrum Analyzer using 100 kHz RBW and VBW=300 kHz.

The bandwidth requirement found in FCC Part 15.247(a)(2) and RSS 210 A8.2(a) requires a minimum -6dBc occupied bandwidth of 500 kHz. In addition, Industry Canada (IC RSS GEN 4.6.1) requires the measurement of the -20dBc occupied bandwidth. For this portion of the tests, a direct measurement of the transmitted signal was performed at the antenna port of the EUT, via a cable connection to the Agilent E4446A spectrum analyzer. An attenuator was placed in series with the cable to protect the spectrum analyzer. The loss from the cable and the attenuator were added on the analyzer as gain offset settings, thereby allowing direct measurements, without the need for any further corrections. The resolution bandwidth set to 100 kHz for this portion of the tests. The EUT was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source. The spectrum analyzer was used in peak-hold mode while measurements were made, as presented in the chart below.

From this data, the closest measurement (6 dB bandwidth) when compared to the specified limit, is 1200 kHz, which is 700 kHz greater than the minimum of 500 kHz.

### 7.3 Test Equipment List

Test Equipment	Manufacturer	Model No.	Serial No.
Spectrum Analyzer	Agilent	E4446A	US45300564

### 7.4 Test Data

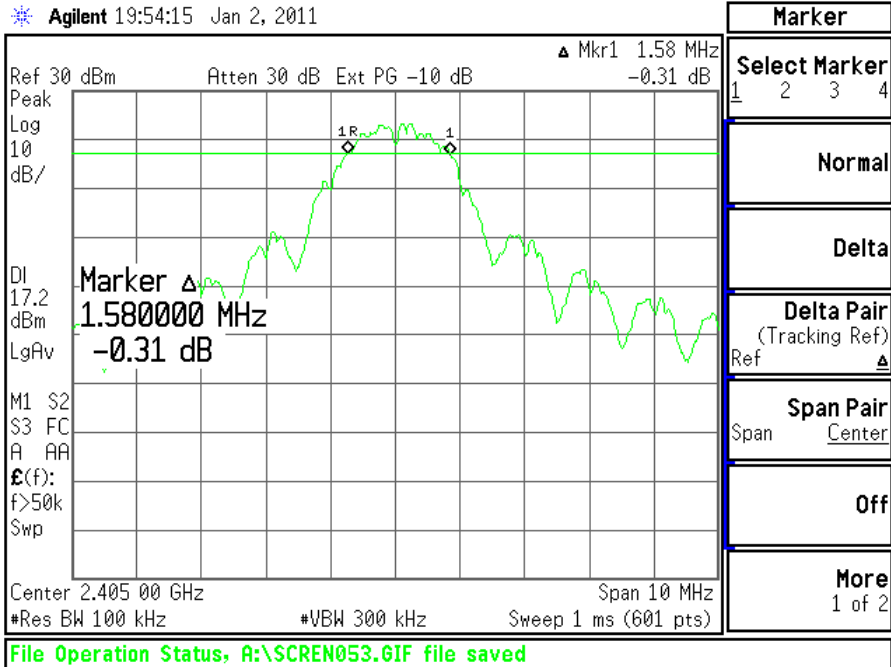
Channel	Center Frequency (MHz)	Measured -6 dBc Occ. BW (kHz)	Minimum -6 dBc Limit (kHz)	Measured -20 dBc Occ. Bw (kHz)
11	2405	1580	500	2224
18	2440	1680	500	2189
23	2465	1630	500	2199
24	2470	1530	500	2254
25	2475	1630	500	2298

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 32 of 59</b>

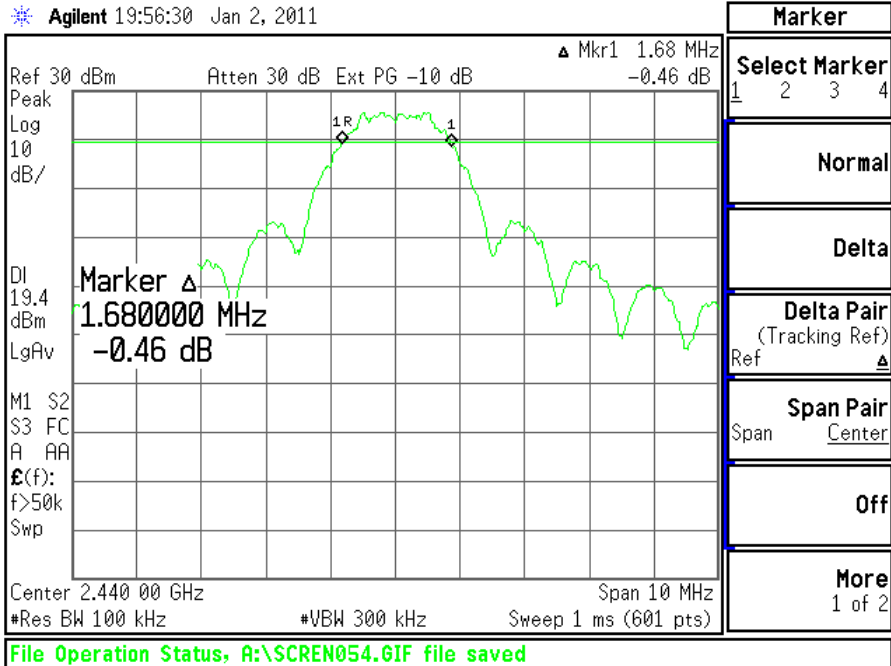


## 7.5 Screen Captures - OCCUPIED BANDWIDTH

### Channel 11, -6 dBc Occupied Bandwidth



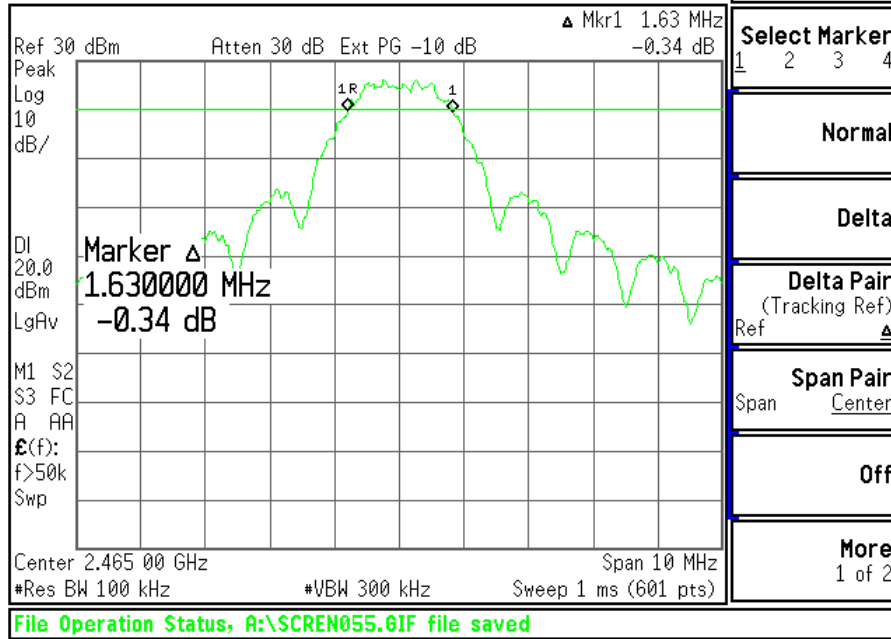
### Channel 18, -6 dBc Occupied Bandwidth



Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	Page 33 of 59

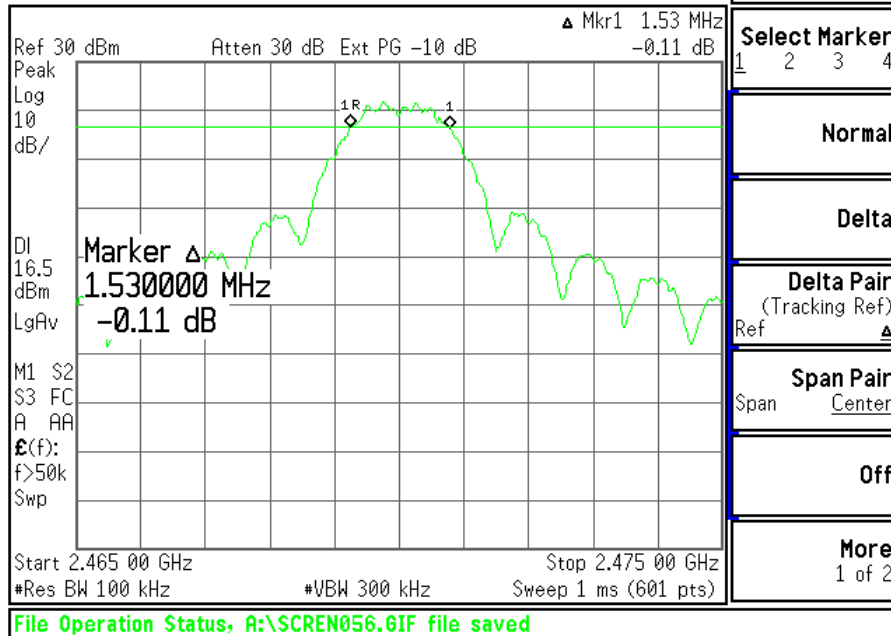
### Channel 23, -6 dBc Occupied Bandwidth

Agilent 19:57:50 Jan 2, 2011



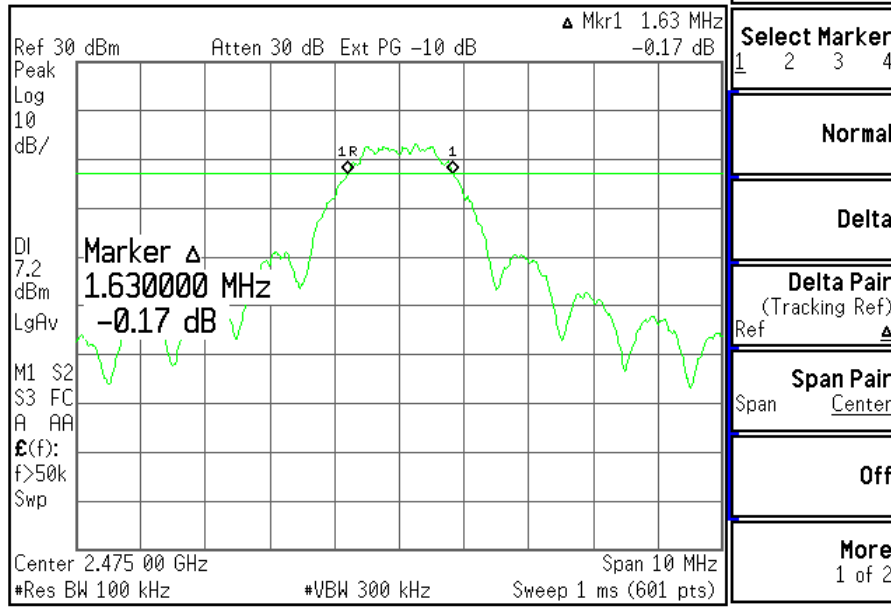
### Channel 24, -6 dBc Occupied Bandwidth

Agilent 20:04:54 Jan 2, 2011



### Channel 25, -6 dBc Occupied Bandwidth

Agilent 20:06:32 Jan 2, 2011

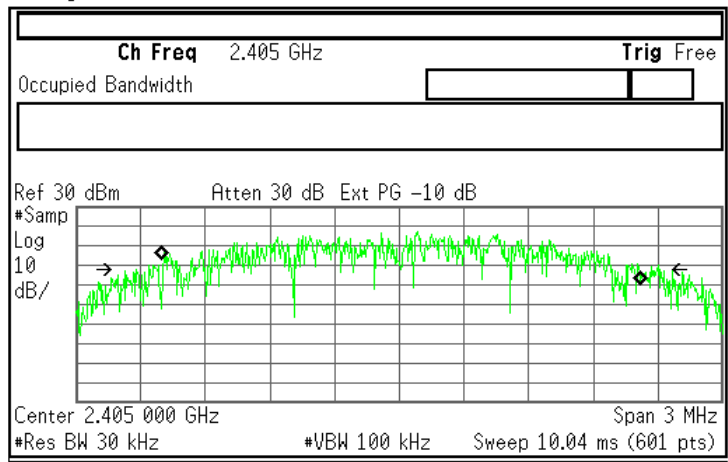


Marker			
Select Marker	1	2	3
Normal			
Delta			
Delta Pair (Tracking Ref)	Ref		$\Delta$
Span Pair	Span	Center	
Off			
More	1 of 2		

File Operation Status, A:\SCREEN057.6IF file saved

### Channel 11, 99% Occupied Bandwidth

Agilent 19:43:01 Jan 2, 2011



Display	
Full Screen	
Display Line	-25.00 dBm
On	Off
Limits	
Active Fctn Position	Center
Title	
Preferences	

Occupied Bandwidth	Occ BW % Pwr	99.00 %
2.2237 MHz	x dB	-20.00 dB
Transmit Freq Error	4.630 kHz	
x dB Bandwidth	2.475 MHz*	

File Operation Status, C:\GORE1.CBL file loaded

### Channel 18, 99% Occupied Bandwidth

\* Agilent 19:43:43 Jan 2, 2011

<b>Ch Freq</b> 2.44 GHz <span style="float:right"><b>Trig</b> Free</span> Occupied Bandwidth <span style="float:right">[ ]</span>		<b>Freq/Channel</b> <b>Center Freq</b> 2.44000000 GHz
<b>Center</b> 2.44000000 GHz		<b>Start Freq</b> 2.43850000 GHz
Ref 30 dBm    Atten 30 dB    Ext PG -10 dB #Samp Log 10 dB/		<b>Stop Freq</b> 2.44150000 GHz
		<b>CF Step</b> 300.000000 kHz Auto    Man
Center 2.440 000 GHz    Span 3 MHz #Res BW 30 kHz    #VBW 100 kHz    Sweep 10.04 ms (601 pts)		<b>Freq Offset</b> 0.00000000 Hz
<b>Occupied Bandwidth</b> <b>Occ BW % Pwr</b> 99.00 % 2.1896 MHz <b>x dB</b> -20.00 dB		<b>Signal Track</b> On    Off
<b>Transmit Freq Error</b> 1.699 kHz <b>x dB Bandwidth</b> 2.505 MHz*		
File Operation Status, A:\SCREEN049.GIF file saved		

### Channel 23, 99% Occupied Bandwidth

\* Agilent 19:48:17 Jan 2, 2011

<b>Ch Freq</b> 2.465 GHz <span style="float:right"><b>Trig</b> Free</span> Occupied Bandwidth <span style="float:right">[ ]</span>		<b>Freq/Channel</b> <b>Center Freq</b> 2.46500000 GHz
<b>Start</b> 2.46350000 GHz		<b>Start Freq</b> 2.46350000 GHz
Ref 30 dBm    Atten 30 dB    Ext PG -10 dB #Samp Log 10 dB/		<b>Stop Freq</b> 2.46650000 GHz
		<b>CF Step</b> 300.000000 kHz Auto    Man
Start 2.463 500 GHz    Stop 2.466 500 GHz #Res BW 30 kHz    #VBW 100 kHz    Sweep 10.04 ms (601 pts)		<b>Freq Offset</b> 0.00000000 Hz
<b>Occupied Bandwidth</b> <b>Occ BW % Pwr</b> 99.00 % 2.1995 MHz <b>x dB</b> -20.00 dB		<b>Signal Track</b> On    Off
<b>Transmit Freq Error</b> -7.027 kHz <b>x dB Bandwidth</b> 2.470 MHz*		
File Operation Status, A:\SCREEN050.GIF file saved		

### Channel 24, 99% Occupied Bandwidth

Agilent 19:50:11 Jan 2, 2011

<b>Ch Freq</b> 2.47 GHz <b>Trig</b> Free		<b>Freq/Channel</b>													
Occupied Bandwidth <span style="border: 1px solid black; display: inline-block; width: 100px; height: 15px;"></span>		<b>Center Freq</b> 2.47000000 GHz													
<b>Center 2.47000000 GHz</b>															
Ref 30 dBm      Atten 30 dB   Ext PG -10 dB		<b>Start Freq</b> 2.46850000 GHz													
#Samp Log 10 dB/		<b>Stop Freq</b> 2.47150000 GHz													
		<b>CF Step</b> 300.000000 kHz Auto          Man													
Center 2.470 000 GHz                      Span 3 MHz		<b>Freq Offset</b> 0.00000000 Hz													
#Res BW 30 kHz                      #VBW 100 kHz      Sweep 10.04 ms (601 pts)		<b>Signal Track</b> On            Off													
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;"><b>Occupied Bandwidth</b></td> <td style="text-align: center;"><b>Occ BW % Pwr</b></td> <td style="text-align: center;">99.00 %</td> </tr> <tr> <td style="text-align: center;"><b>2.2539 MHz</b></td> <td style="text-align: center;"><b>x dB</b></td> <td style="text-align: center;">-20.00 dB</td> </tr> <tr> <td><b>Transmit Freq Error</b></td> <td style="text-align: center;">-13.357 kHz</td> <td></td> </tr> <tr> <td><b>x dB Bandwidth</b></td> <td style="text-align: center;">2.541 MHz*</td> <td></td> </tr> </table>				<b>Occupied Bandwidth</b>	<b>Occ BW % Pwr</b>	99.00 %	<b>2.2539 MHz</b>	<b>x dB</b>	-20.00 dB	<b>Transmit Freq Error</b>	-13.357 kHz		<b>x dB Bandwidth</b>	2.541 MHz*	
<b>Occupied Bandwidth</b>	<b>Occ BW % Pwr</b>	99.00 %													
<b>2.2539 MHz</b>	<b>x dB</b>	-20.00 dB													
<b>Transmit Freq Error</b>	-13.357 kHz														
<b>x dB Bandwidth</b>	2.541 MHz*														
<b>File Operation Status, A:\SCREEN051.GIF file saved</b>															

### Channel 25, 99% Occupied Bandwidth

Agilent 19:51:11 Jan 2, 2011

<b>Ch Freq</b> 2.475 GHz <b>Trig</b> Free		<b>Freq/Channel</b>													
Occupied Bandwidth <span style="border: 1px solid black; display: inline-block; width: 100px; height: 15px;"></span>		<b>Center Freq</b> 2.47500000 GHz													
<b>Center 2.47500000 GHz</b>															
Ref 30 dBm      Atten 30 dB   Ext PG -10 dB		<b>Start Freq</b> 2.47350000 GHz													
#Samp Log 10 dB/		<b>Stop Freq</b> 2.47650000 GHz													
		<b>CF Step</b> 300.000000 kHz Auto          Man													
Center 2.475 000 GHz                      Span 3 MHz		<b>Freq Offset</b> 0.00000000 Hz													
#Res BW 30 kHz                      #VBW 100 kHz      Sweep 10.04 ms (601 pts)		<b>Signal Track</b> On            Off													
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;"><b>Occupied Bandwidth</b></td> <td style="text-align: center;"><b>Occ BW % Pwr</b></td> <td style="text-align: center;">99.00 %</td> </tr> <tr> <td style="text-align: center;"><b>2.2978 MHz</b></td> <td style="text-align: center;"><b>x dB</b></td> <td style="text-align: center;">-20.00 dB</td> </tr> <tr> <td><b>Transmit Freq Error</b></td> <td style="text-align: center;">-18.700 kHz</td> <td></td> </tr> <tr> <td><b>x dB Bandwidth</b></td> <td style="text-align: center;">2.626 MHz*</td> <td></td> </tr> </table>				<b>Occupied Bandwidth</b>	<b>Occ BW % Pwr</b>	99.00 %	<b>2.2978 MHz</b>	<b>x dB</b>	-20.00 dB	<b>Transmit Freq Error</b>	-18.700 kHz		<b>x dB Bandwidth</b>	2.626 MHz*	
<b>Occupied Bandwidth</b>	<b>Occ BW % Pwr</b>	99.00 %													
<b>2.2978 MHz</b>	<b>x dB</b>	-20.00 dB													
<b>Transmit Freq Error</b>	-18.700 kHz														
<b>x dB Bandwidth</b>	2.626 MHz*														
<b>File Operation Status, A:\SCREEN052.GIF file saved</b>															

# EXHIBIT 8. BAND-EDGE MEASUREMENTS

## 8.1 Method of Measurements

FCC 15.209(b) and 15.247(d) require a measurement of spurious emission levels to be at least 20 dB lower than the fundamental emission level, in particular at the Band-Edges where the intentional radiator operates. Also, RSS 210 Section 2.2 requires that unwanted emissions meet limits listed in tables 2 and 3 of the same standard and also to the limits in the applicable annex. The following screen captures demonstrate compliance of the intentional radiator at the 2400-2483.5 MHz Band-Edges. The EUT was operated in continuous transmit mode with continuous modulation, with internally generated data as the modulating source. The EUT was operated at the lowest channel for the investigation of the lower Band-Edge, and at the highest channel for the investigation of the higher Band-Edge.

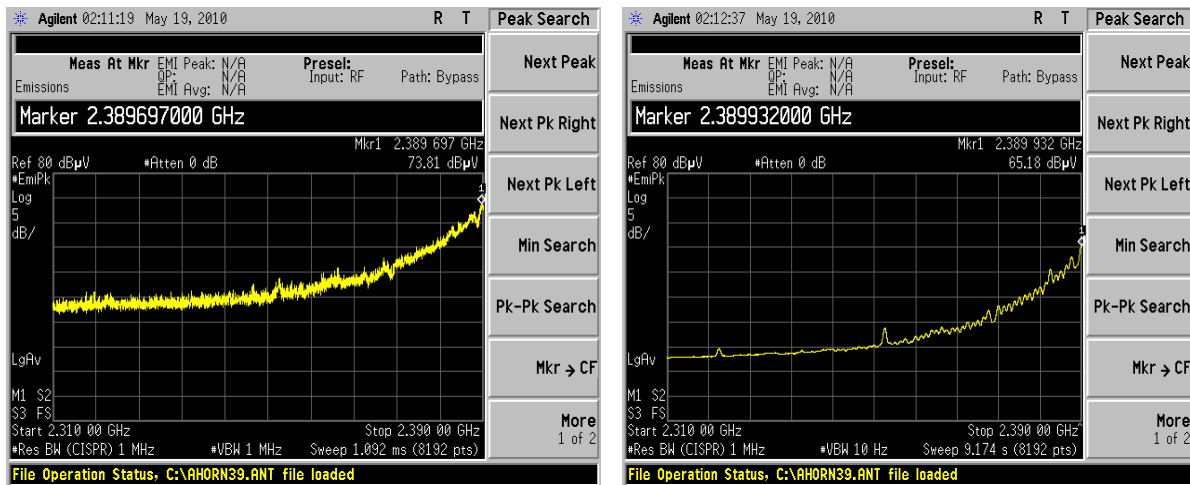
*The Lower Band-Edge limit, from 2390-2400 MHz in this case, would be -20 dBc with respect to the fundamental level.*

*The restricted band limit, 2310-2390 MHz and 2483.5-2500 MHz in this case, would be + 74 dBµV/m peak and + 54 dBµV/m video averaged at 3m.*

**NOTE:** *The bandedge measurements taken require duty-cycle relaxation to be applied. The duty cycle relaxation amount for this product is 20 dB. Therefore, all peak emissions can have a 20dB reduction and thus meet the average limit requirements with the corrected peak reading. Justification for this amount can be found in manufacturer provided documentation available in appendix D of this report.*

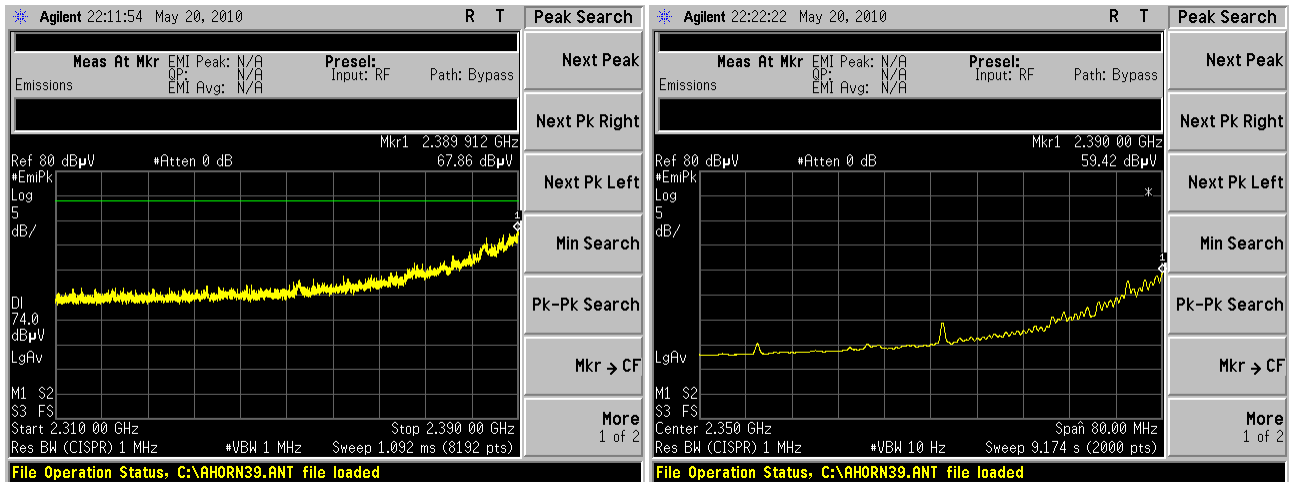
Screen Capture Demonstrating Compliance at the Lower Band-Edge

### 2310-2390 MHz:



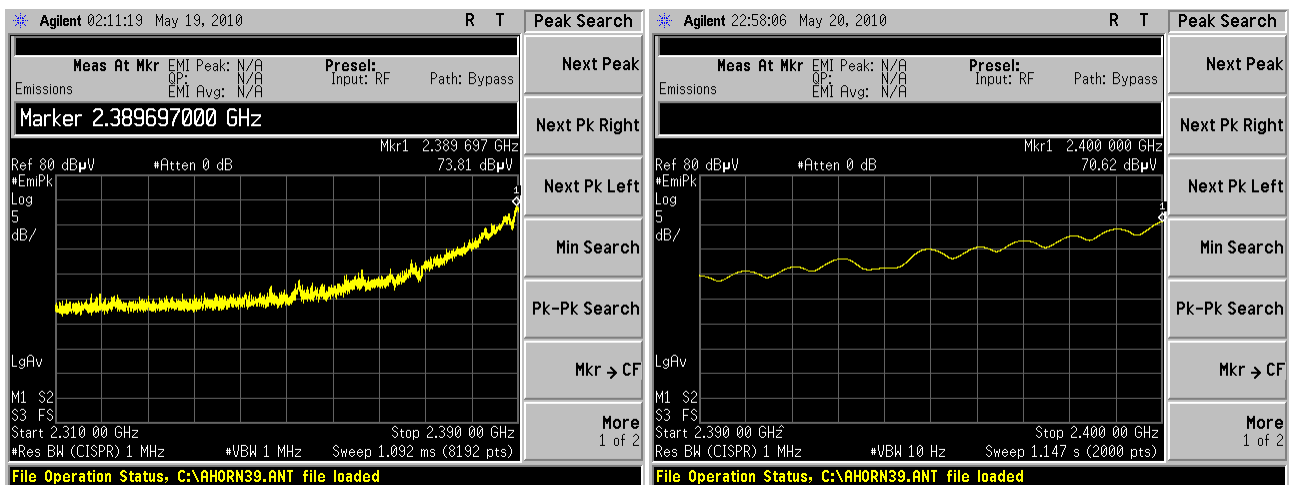
Channel 11, Pwr Level 12

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 38 of 59</b>



Channel 12, Pwr Level 15

2390-2400 MHz:

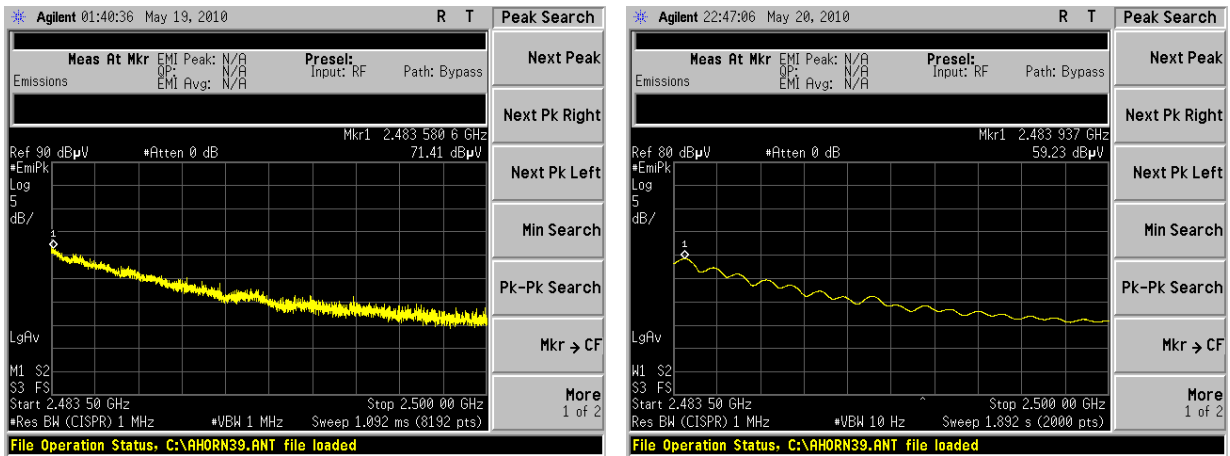


Channel 12, Pwr Level 15

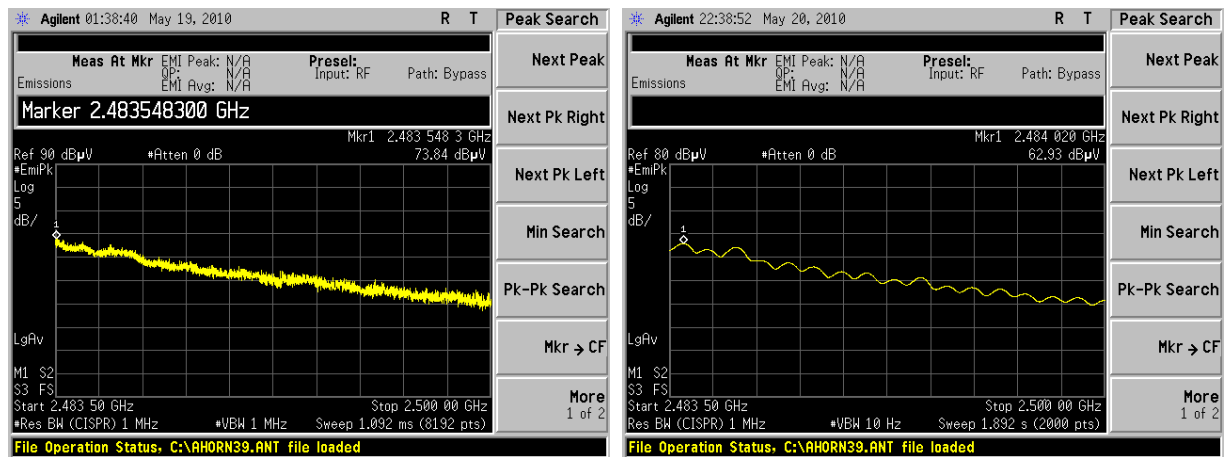
Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	Page 39 of 59

Screen Capture Demonstrating Compliance at the Higher Band-Edge  
2483.5-2500 MHz:

**Channel 25, Power Level 1**



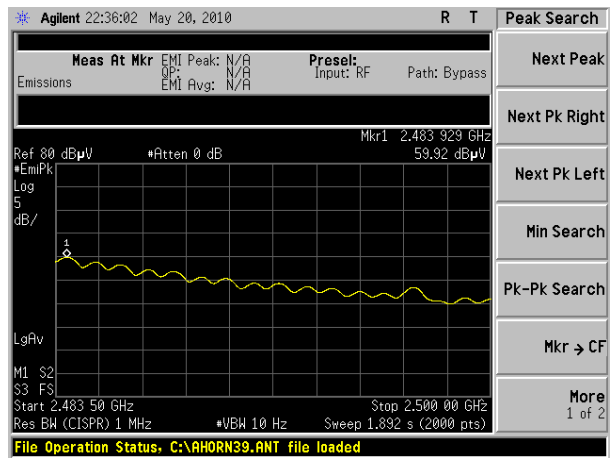
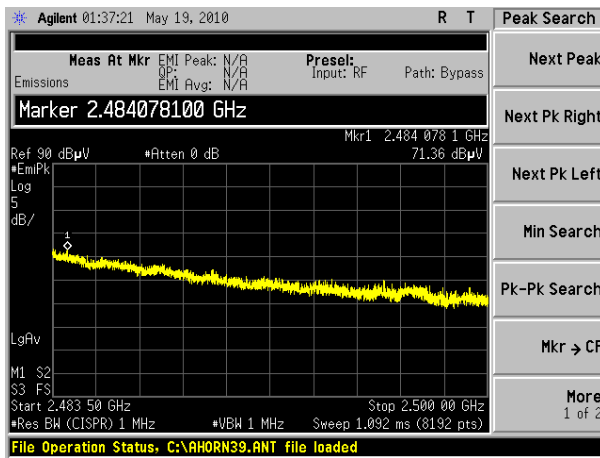
**Channel 24, Power Level 8**



**Channel 23, Power Level 15 (Full Power)**

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 40 of 59</b>





Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	Page 41 of 59

## EXHIBIT 9. POWER OUTPUT (CONDUCTED): 15.247(b)

### 9.1 Method of Measurements

The conducted RF output power of the EUT was measured at the antenna port using a short RF cable along with an attenuator as protection for the spectrum analyzer. The loss from the cable and the attenuator were added on the analyzer as gain offset settings, thereby allowing direct measurements without the need for any further corrections. The unit was configured to run in a continuous transmit mode, while being supplied with internal typical data as a modulation source. The spectrum analyzer was used with resolution and video bandwidths set to 3 MHz, and a span of 10 MHz, with measurements from a peak detector presented in the chart below.

### 9.2 Test Equipment List

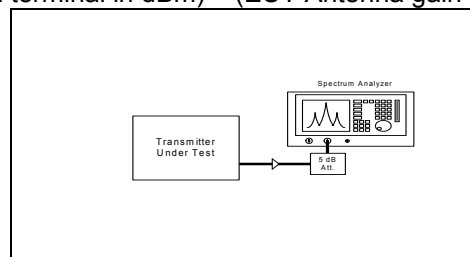
Test Equipment	Manufacturer	Model No.	Serial No.
Spectrum Analyzer	Agilent	E4446A	US45300564

### 9.3 Test Data

Channels 11-24 at maximum power, channel

CHANNEL	CENTER FREQ (MHz)	LIMIT (dBm)	MEASURED POWER (dBm)	MARGIN (dB)	Calculated EIRP (dBm)	EIRP LIMIT (dBm)
11	2405	+30 dBm	26.2	3.9	30.8	36.0
18	2440	+30 dBm	28.5	1.5	33.1	36.0
23	2465	+30 dBm	28.2	1.8	32.8	36.0
24	2470	+30 dBm	24.2	5.8	28.8	36.0
25	2475	+30 dBm	15.8	14.2	20.4	36.0

EIRP = (Peak power at antenna terminal in dBm) + (EUT Antenna gain in dBi)

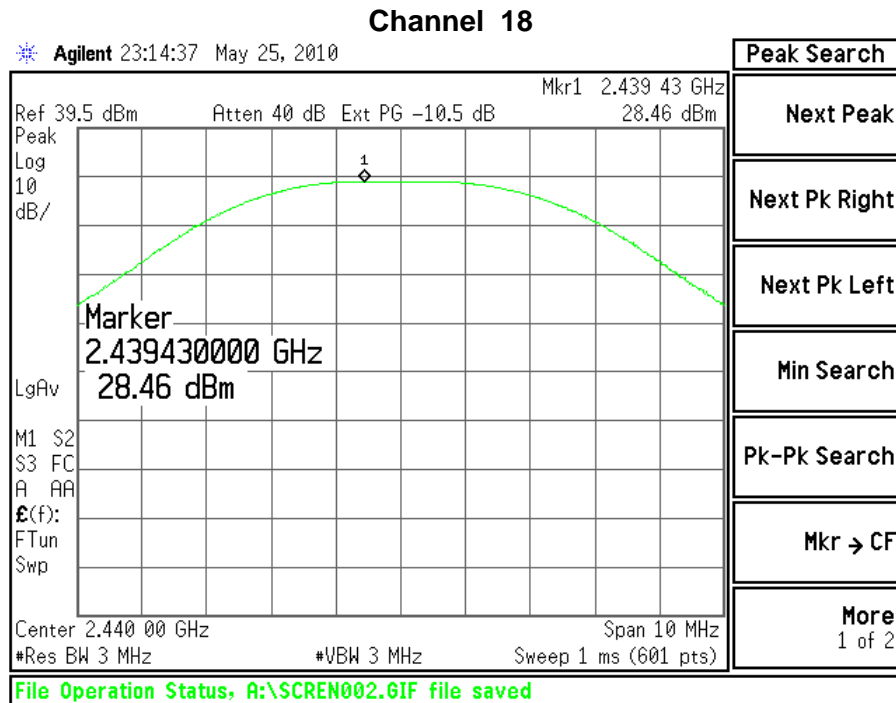
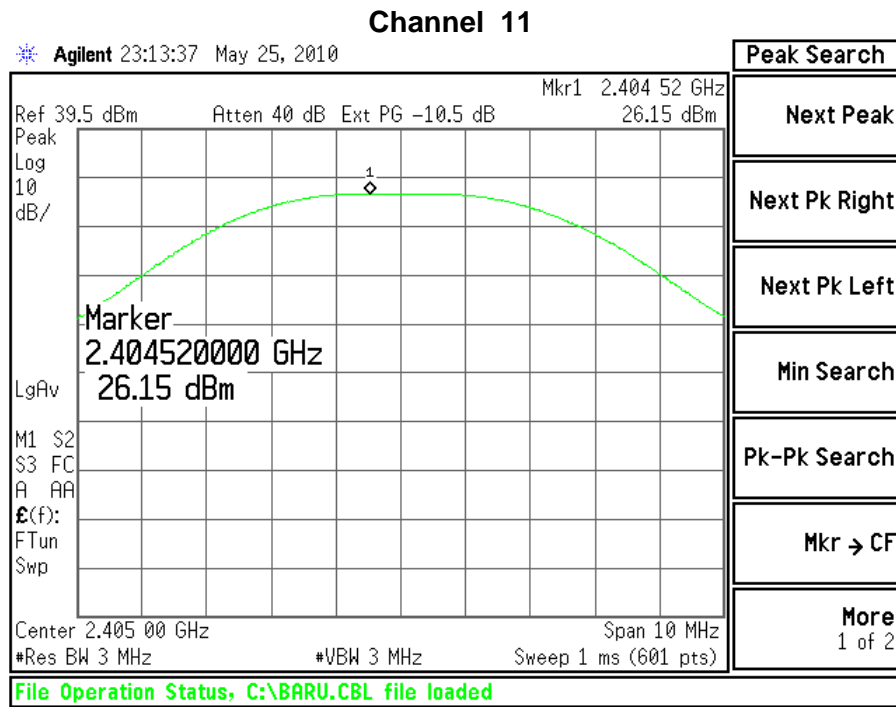


**Rated RF power output (in watts): 1.000 W**  
**Measured RF Power Output (in Watts): 0.708 W (28.5 dBm)**

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
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### 9.4 Screen Captures – Power Output (Conducted)

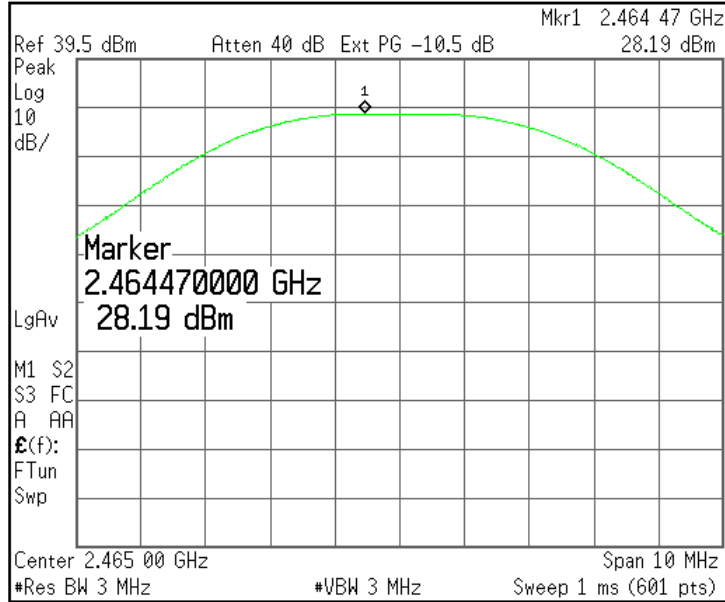
Screen Captures demonstrate worst case scenario using maximum power setting.



Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
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### Channel 23

Agilent 23:17:41 May 25, 2010

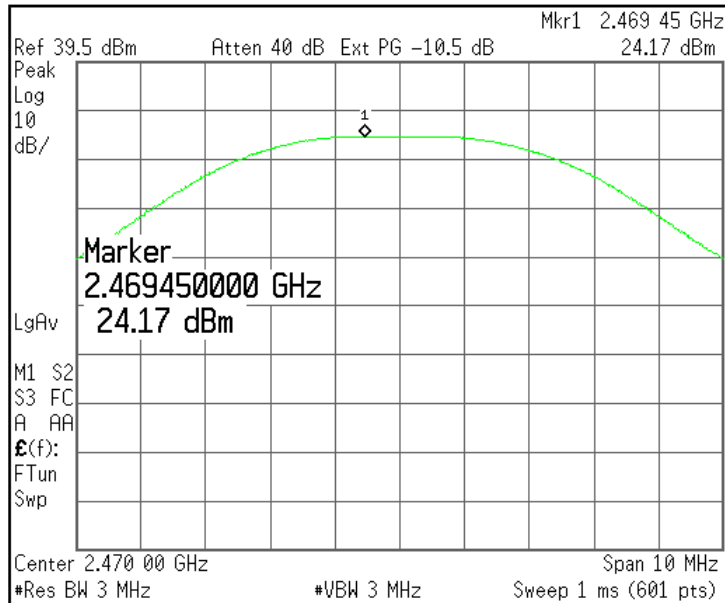


Peak Search	
Next Peak	
Next Pk Right	
Next Pk Left	
Min Search	
Pk-Pk Search	
Mkr → CF	
More	1 of 2

File Operation Status, A:\SCREEN003.6IF file saved

### Channel 24

Agilent 23:18:58 May 25, 2010



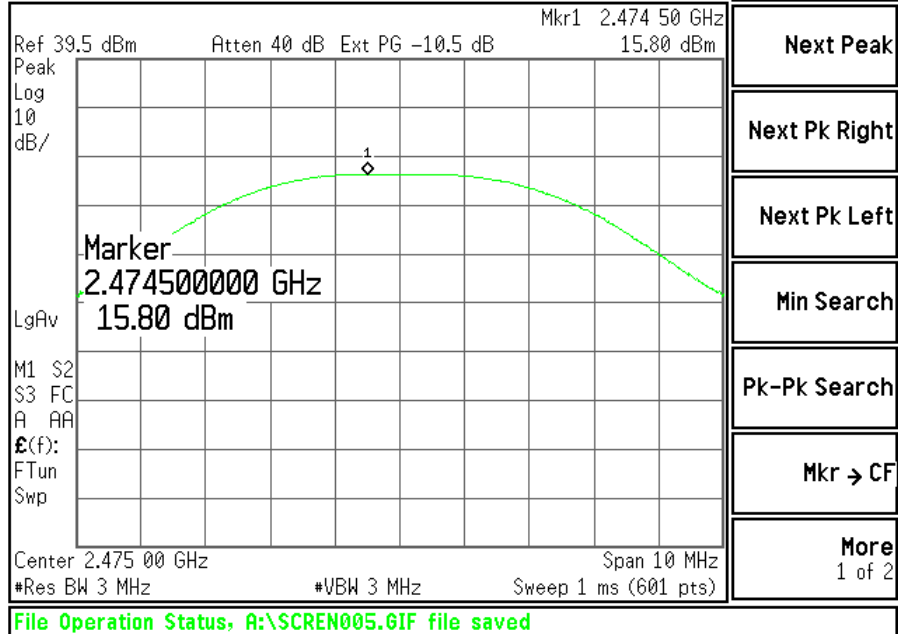
Peak Search	
Next Peak	
Next Pk Right	
Next Pk Left	
Min Search	
Pk-Pk Search	
Mkr → CF	
More	1 of 2

File Operation Status, A:\SCREEN004.6IF file saved

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	Page 44 of 59

### Channel 25

Agilent 23:19:33 May 25, 2010



Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 45 of 59</b>

## EXHIBIT 10. POWER SPECTRAL DENSITY: 15.247(e)

### 10.1 Limits

For digitally modulate systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

In accordance with FCC Part 15.247(e) and RSS 210 A8.2(b), the peak power spectral density should not exceed +8 dBm in any 3 kHz band. This measurement was performed along with the conducted power output readings performed as described in previous sections. The peak output frequency for each representative frequency was scanned, with a narrow bandwidth, and reduced sweep. The noise marker utility built into the HP Analyzer was utilized where the noise marker method gives a reading with a 1 Hz bandwidth. The resultant density was then corrected to a 3 kHz bandwidth. The highest density was found to be no greater than 1.88 dBm, which is under the allowable limit by 6.12 dB.

CORRECTION:

$$10 \cdot \log(3000) = 34.77 \text{ dB}$$

### 10.2 Test Equipment List

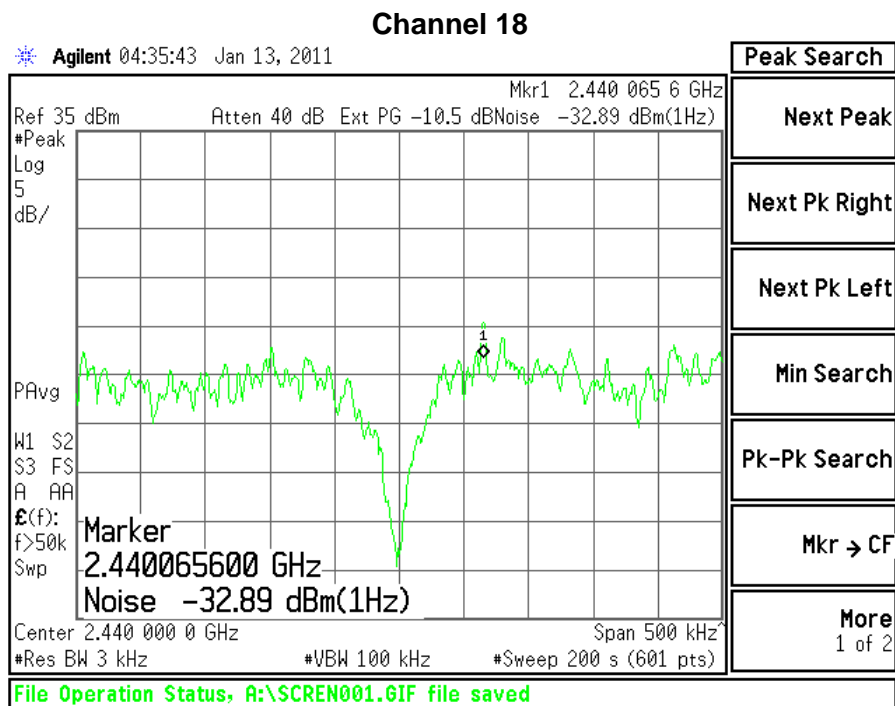
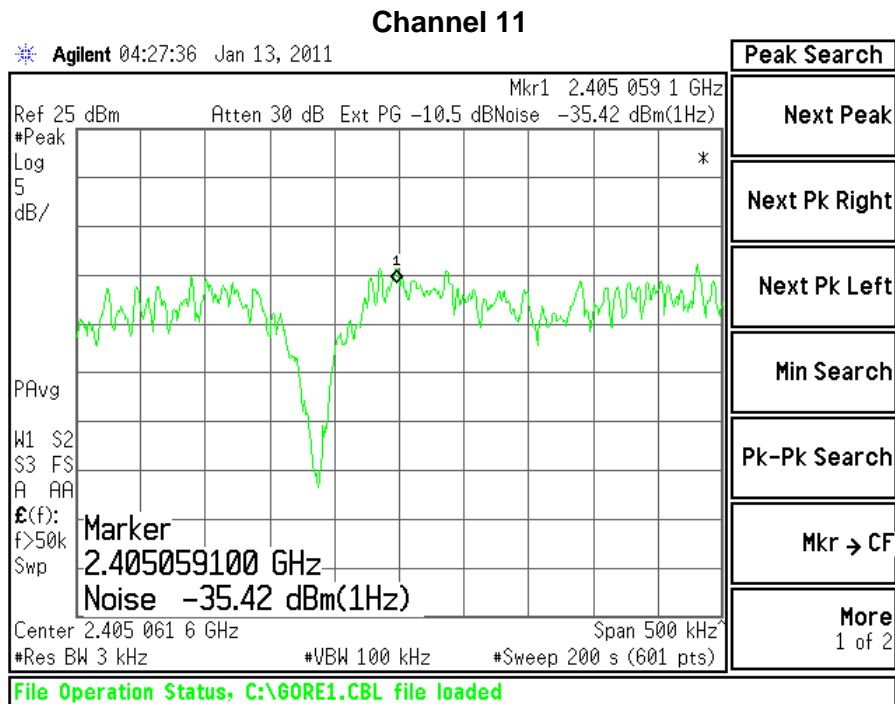
Test Equipment	Manufacturer	Model No.	Serial No.
Spectrum Analyzer	Agilent	E4446A	US45300564

### 10.3 Test Data

Frequency (MHz)	RF Power Level In 1Hz BW (dBm)	Correction (dB)	RF Power Level in 3 kHz BW (dBm)	Limit (dBm/3 kHz)	Margin (dB)	Comments Pass/Fail
2405	-35.42	34.77	-0.65	8.00	8.65	PASS
2440	-32.89	34.77	1.88	8.00	6.12	PASS
2465	-33.30	34.77	1.47	8.00	6.53	PASS
2470	-37.25	34.77	-2.48	8.00	10.48	PASS
2475	-47.11	34.77	-12.34	8.00	20.34	PASS

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 46 of 59</b>

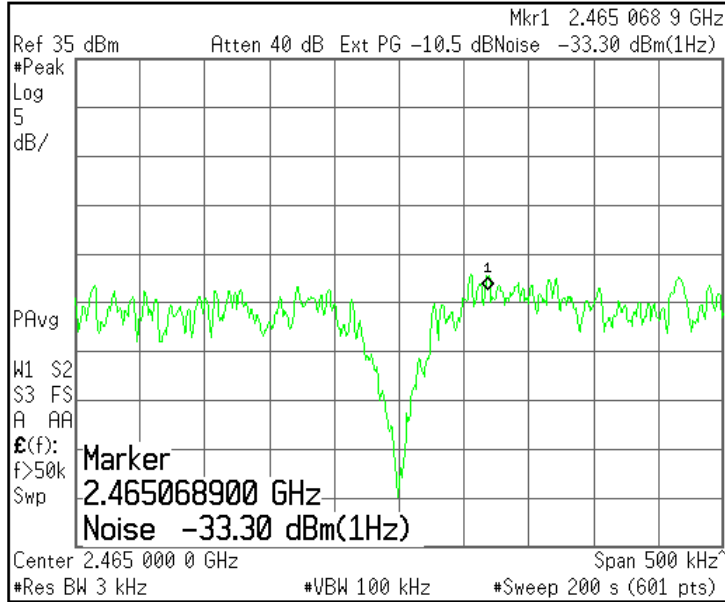
## 10.4 Screen Captures – Power Spectral Density



Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 47 of 59</b>

### Channel 23

Agilent 04:41:38 Jan 13, 2011



Peak Search

Next Peak

Next Pk Right

Next Pk Left

Min Search

Pk-Pk Search

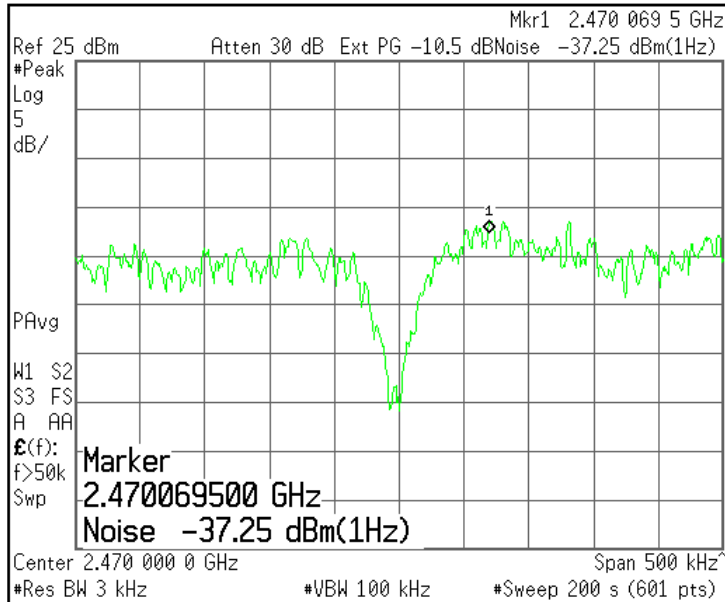
Mkr → CF

More  
1 of 2

File Operation Status, A:\SCREEN002.GIF file saved

### Channel 24

Agilent 05:05:19 Jan 13, 2011



Peak Search

Next Peak

Next Pk Right

Next Pk Left

Min Search

Pk-Pk Search

Mkr → CF

More  
1 of 2

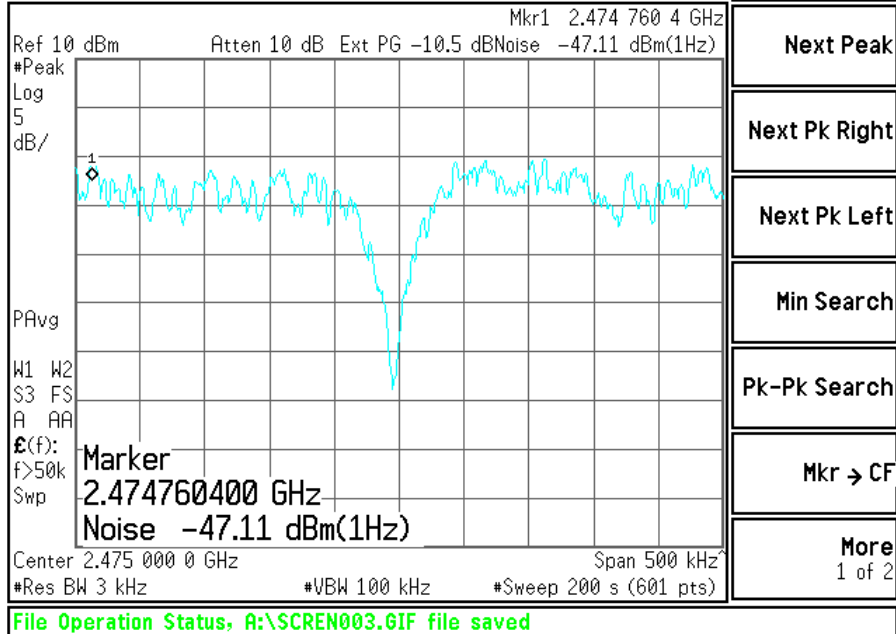
File Operation Status, A:\SCREEN004.GIF file saved

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	Page 48 of 59



## Channel 25

Agilent 04:56:47 Jan 13, 2011



**Peak Search**

- Next Peak
- Next Pk Right
- Next Pk Left
- Min Search
- Pk-Pk Search
- Mkr → CF
- More  
1 of 2

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 49 of 59</b>

## EXHIBIT 11. SPURIOUS CONDUCTED EMISSIONS: 15.247(d)

### 11.1 Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 db below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

In addition, radiated emissions, which fall in the restricted band, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(e)

#### Remarks:

- Applies to harmonics/spurious emissions that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209.
- The emission limits as specified above are based on measurement instrument employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

#### FCC 47 CFR 15.205(a) – Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090 – 0.110	162.0125 – 167.17	2310 – 2390	9.3 – 9.5
0.49 – 0.51	167.72 – 173.2	2483.5 – 2500	10.6 – 12.7
2.1735 – 2.1905	240 – 285	2655 – 2900	13.25 – 13.4
8.362 – 8.366	322 – 335.4	3260 – 3267	14.47 – 14.5
13.36 – 13.41	399.9 – 410	3332 – 3339	14.35 – 16.2
25.5 – 25.67	608 – 614	3345.8 – 3358	17.7 – 21.4
37.5 – 38.25	960 – 1240	3600 – 4400	22.01 – 23.12
73 – 75.4	1300 – 1427	4500 – 5250	23.6 – 24.0
108 – 121.94	1435 – 1626.5	5350 – 5460	31.2 – 31.8
123 – 138	1660 – 1710	7250 – 7750	36.43 – 36.5
149.9 – 150.05	1718.8 – 1722.2	8025 – 8500	Above 38.6
156.7 – 156.9	2200 – 2300	9000 – 9200	

#### FCC 47 CFR 15.209(a) Field Strength Limits within Restricted Frequency Bands

Frequency (MHz)	Field Strength Limits (microvolts/m)	Distance (Meters)
0.009 – 0.490	2,400 / F (kHz)	300
0.490 – 1.705	24,000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
Report # 310124	Model #: RES-3000-FOCUS	Template: 15.109 Class B DTS RX 10-22-09
LSR Job #: C-904	Serial #: NBZB0000110	<b>Page 50 of 59</b>

FCC Part 15.247(d) and IC RSS 210 A8.5 requires a measurement of conducted harmonic and spurious RF emission levels, as reference to the carrier level when measured in a 100 kHz bandwidth. For this test, the spurious and harmonic RF emissions from the EUT were measured at the EUT antenna port using a short RF cable along with an attenuator as protection for the spectrum analyzer. The loss from the cable and the attenuator were added on the analyzer as gain offset settings, there by allowing direct readings of the measurements made without the need for any further corrections. An Agilent model E4446A spectrum analyzer was used with the resolution bandwidth set to 100 kHz for this portion of the tests. The unit was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source. The spectrum analyzer was used with measurements from a peak detector presented in the chart below. Screen captures were acquired and any noticeable spurious and harmonic signals were identified and measured.

No significant emissions could be noted within -50 dBc of the fundamental level for this product.

### 11.2 Test Data

Fundamental Frequency: 2405, 2440, 2475

Modulation: O-QPSK

Frequency Test Range: 30-25000 MHz

	Channel 1	Channel 18	Channel 23	Channel 24	Channel 25
Fundamental	26.24	28.65	28.43	24.17	16.54
2 <sup>nd</sup> Harmonic	-33.34	-34.85	-34.26	-34.01	-34.52
3 <sup>rd</sup> Harmonic	-31.61	-31.12	-31.73	-32.03	-32.77
4 <sup>th</sup> Harmonic	-31.82	-31.58	-32.75	-32.73	-32.63
5 <sup>th</sup> Harmonic	-31.50	-30.50	-32.25	-31.05	-30.88
6 <sup>th</sup> Harmonic	-29.13	-28.07	-28.73	-28.39	-28.38
7 <sup>th</sup> Harmonic	-29.88	-28.26	-29.16	-29.63	-29.79
8 <sup>th</sup> Harmonic	-29.43	-29.67	-29.95	-30.38	-30.68
9 <sup>th</sup> Harmonic	-28.93	-27.53	-28.42	-29.58	-28.93
10 <sup>th</sup> Harmonic	-25.51	-25.94	-25.80	-26.10	-25.53

Notes:

(1) All measurements are in the unit of dBm.

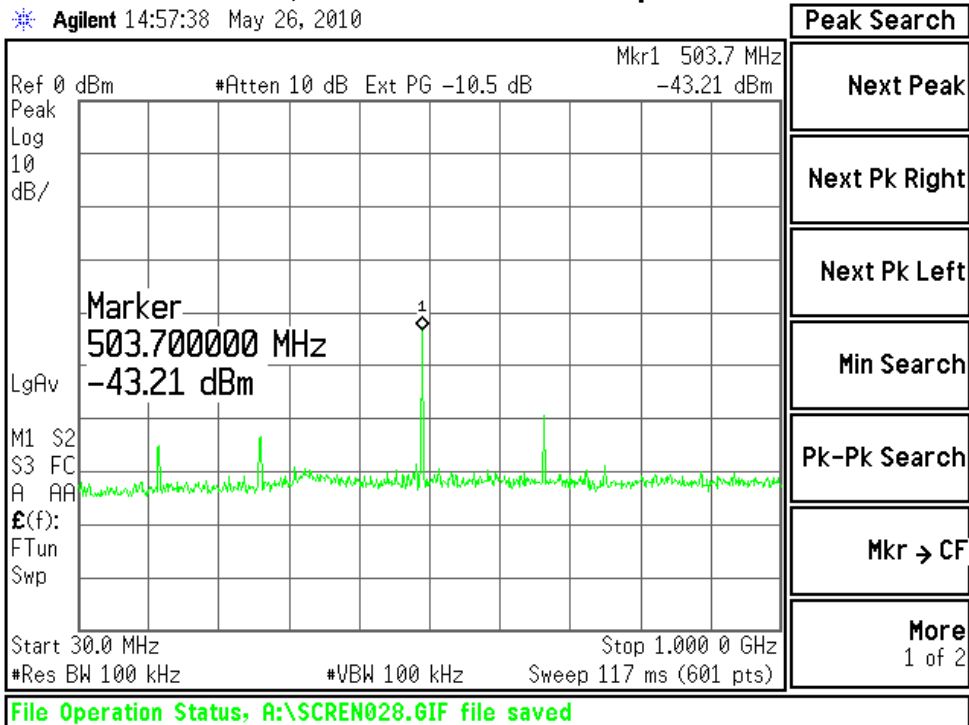
### 11.3 Test Equipment List

Test Equipment	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer	Agilent	E4446A	US45300564	3 Hz To 44 GHz

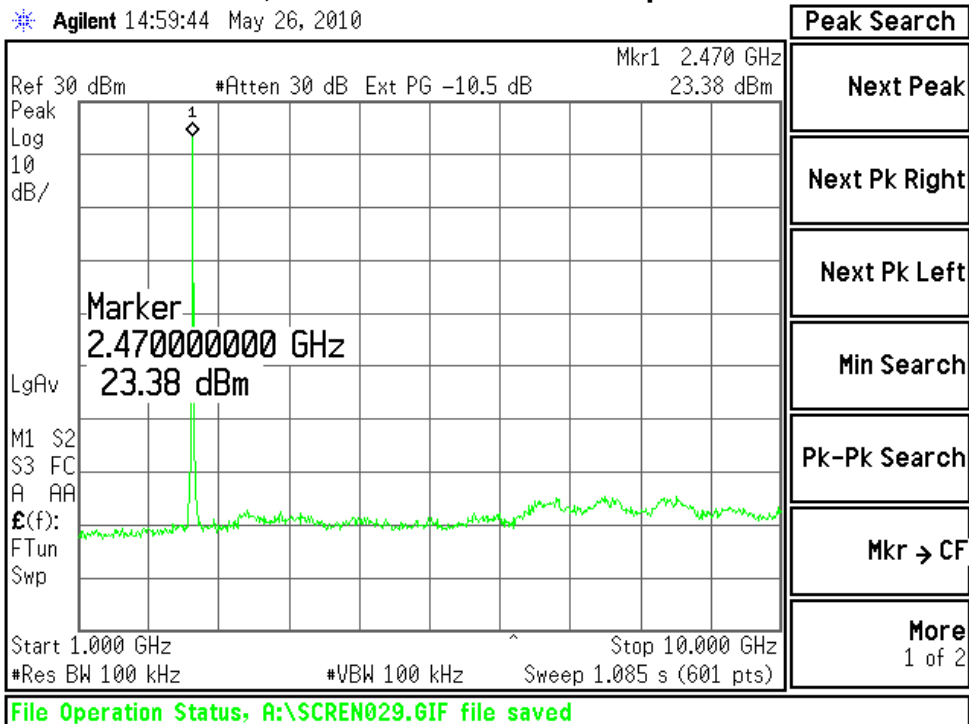
Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
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## 11.4 Screen Captures – Spurious Radiated Emissions

### Channel 23, shown from 30 MHz up to 1000 MHz



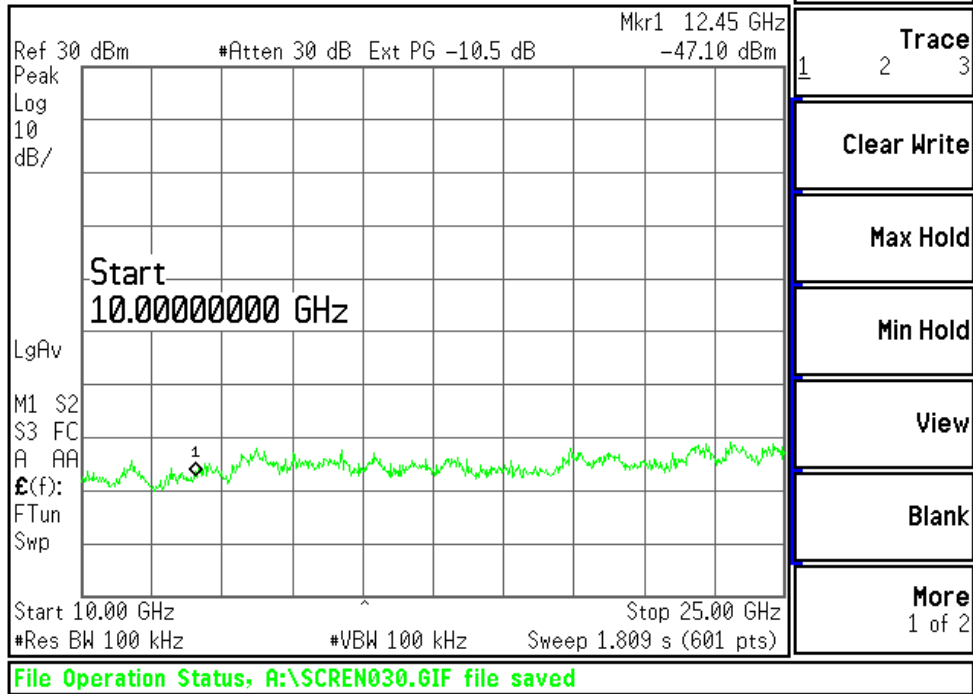
### Channel 23, shown from 1000 MHz up to 10000 MHz



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### Channel 23, shown from 10000 MHz up to 25000 MHz

Agilent 15:01:53 May 26, 2010



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## EXHIBIT 12. FREQUENCY & POWER STABILITY OVER VOLTAGE VARIATIONS

The stability of the device was examined as a function of the input voltage available to the EUT. A Spectrum Analyzer was used to measure the frequency at the appropriate frequency markers. The transmitter portion of the EUT placed in continuous transmit mode. Power was supplied by an external bench-type variable power supply, and the frequency of operation was monitored using the spectrum analyzer.

In this case, the nominal voltage is 3.3 VDC. A reduction of 15% from the nominal voltage is 2.8V and an increase of 15% from the nominal voltage is 3.8V.

A spectrum analyzer was used to measure the frequency at the appropriate frequency markers. For this test, the EUT was placed in continuous transmit CW mode. Power to the EUT was supplied by an external bench-type variable power supply. The frequency of operation was monitored using the spectrum analyzer with RBW=VBW=1 kHz settings while the voltage was varied.

DC Voltage Source		
2.8 VDC	3.3 VDC	3.8 VDC
2404.550000 (MHz)	2405.250000 (MHz)	2405.258000 (MHz)
2440.499080 (MHz)	2440.498680 (MHz)	2440.498120 (MHz)
2465.000430 (MHz)	2464.998800 (MHz)	2464.998630 (MHz)
2470.053300 (MHz)	2470.450000 (MHz)	2470.450000 (MHz)
2475.058000 (MHz)	2475.067000 (MHz)	2475.058000 (MHz)

The RF Power Output of the EUT was also monitored in a separate test, also using a Spectrum Analyzer with RBW=VBW=3 MHz setting while the voltage was varied.

DC/AC Voltage Source		
2.8 VDC	3.3 VDC	3.8 VDC
25.83 (dBm)	26.32 (dBm)	26.44 (dBm)
27.74 (dBm)	28.70 (dBm)	29.46 (dBm)
27.29 (dBm)	28.35 (dBm)	29.34 (dBm)
23.10 (dBm)	24.34 (dBm)	24.35 (dBm)
14.97 (dBm)	15.27 (dBm)	15.66 (dBm)

The power was then cycled On/Off to observe system response. No unusual response was observed, the emission characterizes were well behaved, and the system returned to the same state of operation as before the power cycle.

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## APPENDIX A



Date: 20-Jun-2010 Type Test: Power Spectral Density Job #: C-904  
 Prepared By: Peter Customer: Trilliant Quote #: 310124

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960144	Phaseflex	Gore	EKD01D010720	5800373	6/4/2010	6/4/2011	Active Calibration
2	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/17/2009	9/17/2010	Active Calibration



Date: 20-Jun-2010 Type Test: Conducted Power Output Job #: C-904  
 Prepared By: Peter Customer: Trilliant Quote #: 310124

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960144	Phaseflex	Gore	EKD01D010720	5800373	6/4/2010	6/4/2011	Active Calibration
2	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/17/2009	9/17/2010	Active Calibration



Date: 19-May-2010 Type Test: Occupied Bandwidth (6dB & 20dB) Job #: C-904  
 Prepared By: \_\_\_\_\_ Customer: Trilliant Quote #: 310124

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/17/2009	9/17/2010	Active Calibration
2	AA 960144	Phaseflex	Gore	EKD01D010720	5800373	6/4/2010	6/4/2011	Active Calibration



Date: 20-Jun-2010 Type Test: Radiated Emissions Job #: C-904  
 Prepared By: Peter Customer: Trilliant Quote #: 310124

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960007	Double Ridge Horn Antenna	EMCO	3115	9311-4138	11/10/2009	11/10/2010	Active Calibration
2	AA 960087	Bi-Log Antenna	EMCO	3142-C	46678	9/15/2009	9/15/2010	Active Calibration
3	AA 960150	Bicon Antenna	ETS	3110B	0003-3346	11/3/2009	11/3/2010	Active Calibration
4	EE 960157	3Hz-13.2GHz Spectrum Analyzer	Agilent	E4445A	MY46250225	6/7/2010	6/7/2011	Active Calibration
5	EE 960158	RF Preselector	Agilent	N9039A	MY46520110	6/7/2010	6/7/2011	Active Calibration
6	AA 960081	Double Ridge Horn Antenna	EMCO	3115	6907	12/22/2009	12/22/2010	Active Calibration
7	EE 960147	Pre-Amp	Adv. Micro	WLA612	123101	12/28/2009	12/28/2010	Active Calibration
8	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/17/2009	9/17/2010	Active Calibration

Prepared For: <u>Trilliant</u>	EUT: <u>Focus Meter</u>	LS Research, LLC
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**APPENDIX C**  
**Uncertainty Statement**

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of k=2.

*Table of Expanded Uncertainty Values, (K=2) for Specified Measurements*

Measurement Type	Particular Configuration	Uncertainty Values
Radiated Emissions	3 – Meter chamber, Biconical Antenna	4.24 dB
Radiated Emissions	3-Meter Chamber, Log Periodic Antenna	4.8 dB
Radiated Emissions	10-Meter OATS, Biconical Antenna	4.18 dB
Radiated Emissions	10-Meter OATS, Log Periodic Antenna	3.92 dB
Conducted Emissions	Shielded Room/EMCO LISN	1.60 dB
Radiated Immunity	3 Volts/Meter in 3-Meter Chamber	1.128 Volts/Meter
Conducted Immunity	3 Volts level	1.0 V

**APPENDIX D**  
**Justifications of Average Duty Factor Calculations**

**Trilliant 1 Watt SecureMesh Radio Module  
Relaxation Factor**



**August 9, 2009**

The Trilliant SecureMesh 1 Watt Radio Module will not transmit for more than 4.35ms over a 43.5ms time period. The justification is based upon the following conditions:

- 1) Transmit packet size 131 bytes maximum, for 4.19ms transmission duration.
- 2) Data rate 250kbps.
- 3) Each radio waits for acknowledgement prior to retransmission.
- 4) Acknowledgement is 5 bytes, or 0.16ms transmission duration.
- 5) Maximum number of hops per mesh network is 10.

Documentation is justified as below:

**Example 1 – Trilliant SecureMesh Network – Source to Destination Requires Ten Hops**

Typical broadcast over a large network (10 radios) includes:

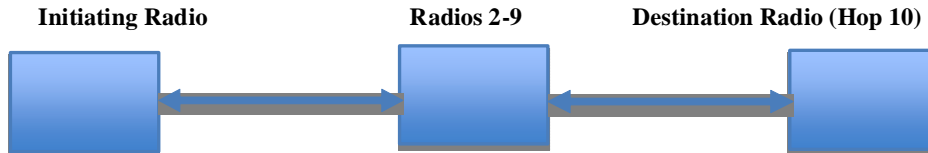
- A) Message is transmitted by the initiating radio (first hop). Total transmit time is 4.19ms.
- B) Transmission time to the destination radio (10<sup>th</sup> hop- assuming no retries), requires an additional 37.71ms.
- C) Acknowledgement from destination radio to initiating radio requires 1.6 ms, assuming no retries.

**Large network, No Retries**

Transmit time: 4.19ms  
Total on time: 43.5ms  
Total on time per radio (Tx packet plus Ack Packet): 4.35ms  
Total percentage on time per radio/best case: 10.00 per cent

Note: The Large Network, No Retries offers the highest utilization. A ten-hop mesh network will typically require retries which reduce the throughput of the system. Retries will effectively reduce the duty cycle of the radios.

**Network Topology**



Prepared For: Trilliant	EUT: Focus Meter	LS Research, LLC
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**Average (Relaxation) Factor**

Average Factor =  $20 * \text{Log}_{10}$  (Worst Case EUT On-time over 100 ms time window)

The transmit packet occupies  $4.35\text{ms} * 2 = 8.7$  ms of time, within any 100 ms window. Therefore, the relaxation factor allowance is calculated as:

Average Factor =  $20 * \text{Log}_{10}$  (8.7 / 100 ms) = -21.2 dB

A relaxation factor of allowable dB would be allowable for this product.

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